CW SAMPLE COPY
MI48106UNIVMUSER FOR
UNIVERSITY
SERIAL PUBL.
300 N ZEEB
ANN ARBOR

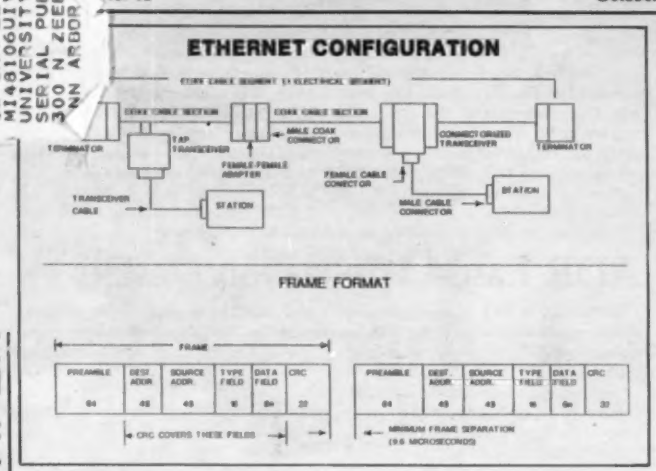
COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Weekly Newspaper Second-class postage paid at Framingham, Mass., and additional mailing offices ©1980 by CW Communications, Inc.

No. 41 October 6, 1980 $1.00 a copy; $30/year

NEWSPAPER



Programmers Number 1 In Employer Demand

By Ann Dooley
CW Staff

NEW YORK — Computer personnel are at the top of employers' most wanted lists, beating out 103 other occupations, according to a technical and managerial recruitment firm survey.

Of the more than 100 occupations listed, programmers were the Number 1 job in demand, according to survey respondents. Second highest in demand were systems analysts and Number 3 on the list was electronic circuit design engineers, whose job it is to design the circuitry of computers and other equipment, the survey noted.

Respondents ranked mechanical engineers who, according to the survey, are the people who maintain and suggest improvements on computers and other machinery, as fourth most in demand. Next highest were technical salesmen, then cost accountants and electrical engineers.

Survey results were obtained by asking managers at National Personnel Associates' network of 237 agencies in 145 cities to rank job titles that have increased in demand over the last six months.

A variety of reasons were attributed to the large proportion of computer job categories at the top of the most wanted positions. The advent of the microcomputer, which has enlarged the areas in which computers can be used, has been one factor, and the growth of service bureaus, which has increased the need for programmers, is another, respondents noted.

Hiring Edge

The survey found that programmers with two to five years of experience have a strong hiring advantage over recent graduates, since companies are looking for people who can become productive right away. Programmers with a knowledge of several different languages and who have developed a background in general management information systems are also high in demand.

An excellent growth path is available for personnel to go from programmer to systems analyst to management. "The sky's the limit in advancement because employers like a programming background," one respondent said.

The best jobs for DPers are in manufacturing because that industry offers higher salaries than service firms, such as insurance companies, and therefore provide a better jumping-off point for future jobs, respondents noted.

Computer personnel should also keep abreast of technical developments by subscribing to at least two technical journals and spending at least two to three hours a week reading about advances in the technology, National Personnel Associates suggested.

DEC, Intel, Xerox Announce Specifications for Ethernet

By Marguerite Zientara
CW Staff

Digital Equipment Corp., Intel Corp. and Xerox Corp. have announced the long-awaited specifications for their jointly developed local-area data communications network, Ethernet [CW, May 26].

Ethernet is a passive, coaxial cable-based transmission bus to which a wide variety of smart and dumb terminals can be attached via transceivers. The system also accommodates digitized voice transmission.

Because the medium is passive, the network has no switching logic and is not controlled by a central computer, according to the developers. It simply accepts transmissions from system elements attached to it, such as computers and distributed peripherals.

The Ethernet Specification is a design reference document that describes the required physical, electrical and procedural attributes of network elements.

(Continued on Page 9)

Initial IBM Filing To EPA on TNF 'Insufficient'

By Bruce Hoard
And E. Drake Lundell Jr.
CW Staff

WASHINGTON, D.C. — IBM's initial filing with the Environmental Protection Agency (EPA) regarding the possible carcinogenicity of chemicals in the 3800 printer was "insufficient," an EPA spokesman said, and the followup filing indicates IBM scientists had shown the mutagenic effects of those chemicals two years earlier.

The original filing consisted primarily of results from "Ames" tests of the chemical in question conducted for IBM in 1980 by SRI International, Inc. and older tests conducted on mice in the late 1960s and early 1970s.

(Continued on Page 8)

SNA Viewed Part of Strategy To Lock Users Into IBM Fold

By Jeffry Beeler
CW West Coast Bureau

SAN FRANCISCO — Most IBM users still fail to grasp the full significance of Systems Network Architecture (SNA), and their ignorance threatens "to lock them into an all-IBM environment," according to the head of a Sunnyvale, Calif.-based telecommunications consulting firm.

For the vast majority of users, SNA remains as much of a "mystery" and a "gray fog" today as it was when it first arrived on the data communications scene five years ago, said Telecom Computer Technology (TCT) International, Inc. President Saroj Kar.

Many users still mistakenly believe SNA is just another IBM data communications protocol, an enhanced successor to old standbys like "bisync" and start-stop. In truth, however, SNA goes far beyond either the bisynchronous or start-stop protocols in both its technological complexity and user implications, Kar said recently during a TCT International-sponsored seminar on the subject of "Compatibility with IBM's SNA."

SNA lies at the very heart of IBM's master product strategy for the 1980s and will serve as the "technological foundation" upon which all of IBM's future system and network offerings will be based, Kar said. Thus, IBM users who want to take advantage of the industry giant's next generation of advanced hardware will have little choice but to migrate to SNA sooner or

(Continued on Page 7)

IBM 3270 Market Profiled

Industry Spotlight

By Marcia Blumenthal
CW Staff

By doubling production capacity for its 3270 CRT terminal line last year, IBM gave 3270-compatible terminal vendors fair warning that it intended to regain the market share it has lost to these competitors during the past few years.

As of last December, approximately 720,000 3270-type CRT devices were installed, representing nearly 24% of the total installations of data entry equipment, according to International Data Corp. (IDC). These CRT devices will represent nearly 30% of terminal installations by 1984 — 2.3 million devices.

IDC pegged IBM's share of the 3270 market at 51.5% last year. However, at one time IBM held more than 65% of the market, noted Paul Klein, vice-president of marketing for Memorex Corp.'s Communications group. In the past couple of years IBM has lost considerable ground to approximately 14

(Continued on Page 4)

★ *Info 80 Starts Today — See Stories on Pages 12-14* ★

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

TM reg. U.S. Pat. Off.

Editor E. Drake Lundell Jr.

Managing Editor Nancy French

News Editor Cheryl M. Gelb

Senior Editors:
Industry Marcia Blumenthal
Software Marcy Rosenberg
Communications Brad Schultz
Systems Rita Shoor
Features John C. Whitmarsh

Senior Writer:
Communications Phil Hirsch

Correspondents:
West Coast Jeffry Beeler
Washington, D.C. Jake Kirchner

Writer/Analyst Marguerite Zientara

Staff Writers Tom Henkel
Bruce Hoard
Timothy J. Scannell
Connie Winkler

Chief Copy Editor Catherine Marenghi
Copy Editors Steve Milmore
Linda Rosenthal
Barbara T. VanScoyoc
Donovan White

Photography Editor Ann Dooley

Editorial Assistants Susan M. Blakeney
Martha Taylor

Editorial Cartoonist Jim Orton

Contributors:
Education J. Daniel Couger
Taylor Reports Alan Taylor
Human Connection Jack Stone

For Sales, Circulation and Production contacts, see inside back page.

Please address all correspondence to the appropriate department at 375 Cochituate Road, Rte. 30, Framingham, Mass. 01701. Phone: (617) 879-0700. Telex: 95-1153

OTHER EDITORIAL OFFICES:

West Coast: 257 Lytton Avenue, Palo Alto, California 94301. Phone: (415) 328-8064.

Washington, D.C.: 821 National Press Building, 529 14th Street N.W., Washington, D.C. 20045. Phone: (202) 347-6718.

England: Steve Burton, IDG Publishing Ltd., 146 Clerkenwell Road, London EC1 Phone: 01-837-1222. Telex: UK-269477.

W. Germany: Eckhard Utpadel, CW Publikationens, Friedrichstrasse 31, 8000 Munich 40, Phone: (089) 34-90-61. Telex: 5215350.

Asia: Hidetsuna Sasaki, Dempa/Computerworld Company, Dempa Building, 1-11-15, Higashi Gotanda 1-chome, Shinagawa-ku, Tokyo 141. Phone: (03) 445-6101. Telex: J2424461.

Australia: Alan Power, Computerworld Pty. Ltd., 37-43 Alexander Street, Crows Nest, NSW 2065. Phone: (02) 4395133. Telex: SECCO AA25468.

Brazil: Eric Hippeau, Data News, Computerworld do Brazil, Servicos e Publicacoes Ltda., Rua Alcindo Guanabara, 25/10th floor 20031 Rio de Janeiro, RJ Brazil. Phone: (021) 240-8225. Telex: 2130838(WORD BR).

Mexico: Kevin Kelleghan, Computerworld de Mexico, Oaxaca 21-2, Colonia Roma, Mexico City 7 D.F., Phone: (905) 514-4218, (905) 514-6309.

Second-class postage paid at Framingham, Mass., and additional mailing offices PN127420. *Computerworld* (ISSN-127-420) is published weekly, except: semiweekly the third week in September and a single combined issue the last week in December and the first week in January by CW Communications Inc., 375 Cochituate Road, Framingham, Mass. 01701.

Copyright 1980 by CW Communications/Inc. All rights reserved. Reproduction of material appearing in *Computerworld* and *Computerworld Extra!* is forbidden without written permission. Send all requests to Marion Kibbee.

$1.00 a copy. U.S. – $30 a year; Canada, Central & So. America – $50 a year; Europe and Near East – $90 a year; other foreign – $150 a year (airmail service). Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

Computerworld can be purchased on 35 mm microform through University Microfilm Int., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700. *Computerworld* is indexed: write to Circulation Dept. for subscription information.

ABP mcc MEDIA DATA FORM

POSTMASTER: Send Form 3579 (Change of Address) to Computerworld Circulation Dept., 375 Cochituate Road, Framingham, MA 01701.

Rewrite Bill Delay a Bell Setback

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. – AT&T suffered a significant setback last week when the House Judiciary Committee decided not to approve pending legislation that would replace the 1934 Communications Act. Earlier, the Senate Commerce Committee came to essentially the same conclusion regarding a related bill.

For the phone company, the major virtue of these measures was that they did not break up the Bell System, as demanded by the Department of Justice in its pending antitrust suit. If either measure had passed, it probably would have persuaded the presiding judge in the antitrust case that the government's demand for divestiture was unnecessarily harsh.

But AT&T's loss is tactical, not strategic. Essentially, it means Bell lawyers must now succeed where the company's lobbyists failed.

The Justice Department, however, will almost certainly cite the failure to pass a communications act rewrite bill this year, – after four years of intense discussion – as evidence that Congress has doubts about letting AT&T offer "competitive" services and products through separate subsidiaries on a deregulated basis. This could help persuade the judge that more stringent measures, closer to the divestiture proposed by the government, are necessary.

Last week's House Judiciary committee vote also will weaken AT&T's leverage on Capitol Hill if another attempt is made next year to pass a rewrite bill.

There is some doubt about this at the moment. Rep. Lionel Van Deerlin (D-Calif.), chief sponsor of H.R. 6121, indicated last week that he is not particularly eager to try again. And since the antitrust case is scheduled to go to trial next January, there are probably other legislators in both Houses who would prefer to wait and see what happens in the hopes that the record established during the trial will make their job easier.

But if legislation is introduced next year, the Judiciary Committee will get involved earlier than it did this year. Since the members of the committee appear to be sympathetic to the concerns of computer industry groups which opposed H.R. 6121, that development is likely to reduce the phone company's leverage.

This year, the Judiciary waited until the House Commerce Committee, whose members include Van Deerlin, passed H.R. 6121, before requesting referral of the legislation. When Judiciary completed its review last week, members asserted their right to consider any legislation introduced next year. Later a staff member added that the committee intends to ask for referral when the bill is introduced.

Among those likely to be active in the 1981 telecommunications debate is Rep. Peter Rodino (D-N.J.) who chairs a Judiciary subcommittee. Last summer, shortly after Van Deerlin and his colleagues on the Commerce committee passed H.R. 6121 by a 34-7 vote, Rodino requested referral of the measure to the Judiciary.

ADR Eases Application Design

PRINCETON, N.J. – An application development system designed to improve productivity and cost-effectiveness during the development cycle of on-line and batch commercial applications has been introduced by Applied Data Research, Inc. (ADR).

Ideal (Interactive development environment for an application's life cycle) provides powerful, integrated facilities for accelerating application development in an interactive, user-friendly environment, the vendor claimed.

The product also offers an interactive data dictionary/directory base environment.

It is supported on IBM 370, 30 series and 4300 series and equivalent systems operating under DOS/VSE, VSI and MVS, a spokesman said.

The system's language is simple enough for end users and powerful enough to build sophisticated commercial applications, he said, adding that it is marked by structured organization, relational-like data base reference and update and automatic screen handling.

Interactive Validation

Another feature is interactive validation, compilation and execution of applications. With on-line dictionary-driven validation of applications, programs are compiled with immediate effective feedback and means for user correction of problems, he said.

Also included in the system are:

- Full support for ADR's Datacom/-DB data base management system.
- Support for Vsam data sets.
- User-transparent support of Datacom/DC, Roscoe and CICS/VS.

First delivery will be in the fourth quarter 1981 and the price will be approximately $50,000, exclusive of integrated software components, the vendor said from Rt. 206 & Orchard Road CN-8, Princeton, N.J. 08540.

This Week

IN DEPTH

Distributed Computing ..... Follows Page 68
Management Aspects of Structured Design ID/15
The Software Package Generation ID/27

NEWS

Market Profiled for IBM 3270s 4
Competitors Look Ahead, See Intelligence Added .. 5
FAA May Dismiss Controller for Tampering 7
Doctor Says IBM TNF Tests 'Poorly Designed' 8
HP 9825A Helps Sail Freedom to Cup Victory 9
Drive to Split IBM a 'Dumb Move,' TCA Told 10
County Cuts Annual Election Costs by $75,000 11
Spotlight on the Human Side 12
Industry Pundits and Seers Look Ahead to '80s.... 13
Info 80 to Focus on Management Information 14
USPS Begins Two-Way Intelpost With Canada 15
Unregulated Bell Arm Expected in a Year 16
Salaries Volatile in '79 17
GSA Head Pans State of Federal Computing 18
Federal DP Ills Viewed Unlike Private Sector's..... 19
Courts May Extend Cutoff Date for AT&T's Telpak . 20
Port Selector Solves Heavy Traffic Problem..... 21
'Old Girl Networks' Help Women Get Ahead 22
Do-It-Yourself Service Cuts IBM 1403 Costs 23
Net Doubles University's Computer Capacity..... 24
Diebold Receives 1980 DPMA Sciences Award 26
'Paper Chase' Escalates in IBM Antitrust Trial 27
University, Firms Join in Systems Ed Venture 28
Terminals Roll Perfect Scores for Pro Bowlers 29
Early User's Series/1 Phase-In Not So Smooth 30
T-Shirt Maker 'First' to Link Minis by Satellite 31
POS Units Cater to Duty-Free Shoppers 32
Mini Cuts Supplier's Paper Overload, Ups Sales ... 35
Land Base System Pinpoints City's Problems 36
Turnaround Time..... 47

EDITORIAL

Editorial: Conference Conflicts..... 48
Taylor Report: Questioned Benchmarks 49
Human Connection: Attitudes Make Difference.... 49
Security More Than Secret Code 54
Sociology of Computing: Boom and Bust..... 56

SOFTWARE & SERVICES

Ship Builder Sails Structured Course..... 59
'UFO' Update Compatible With DOS/VSE, FBA.... 60
Modular System Maps in Fortran 62
Vector Automation Offers On-Line Graphics..... 63
Call Traffic Software Gives Cost Data..... 66

COMMUNICATIONS

Xerox Printer/Copier Links IBM Gear..... 69
Multiplexer for HP 1000s Takes Eight Terminals ... 70
Network Processor Offers Host Selection 73

SYSTEMS & PERIPHERALS

Mini Complex Rivals Processing Speed of 370 79
Burroughs OCR Page Reader Boosts WP Tasks ... 82
Board Ties Printronix, Tektronix..... 84

MINIWORLD

MDS Series 1 Adds Printer, Disk Drives..... 85
Multiuser System Based on Z80 86
System/34 Gets Letter-Quality Printer 88

COMPUTER INDUSTRY

U.S. Exports Aiding, Abetting Soviet Military?..... 93
IBM Tightens Squeeze on 3033 Exporters 93
Long-Term Industry Strategy Prescribed for U.S... 95
Informal Poll Finds Racism Felt by Black DPers.... 96
Blumenthal Takes Burroughs Reins Early 97

ADVERTISING INDEX 134

I.Q.

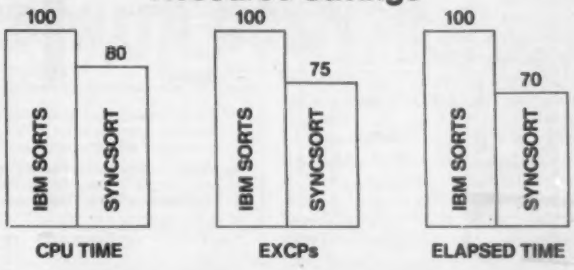
Four reasons why SyncSort is "the smartest kid in the class."

Call (201) 568-9700.

Meet our OS and DOS prodigies.

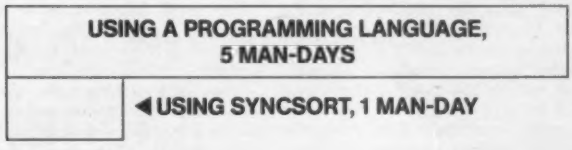
1. MAGNA CUM LAUDE PERFORMANCE. Or more sorting work for fewer computer resources. In typical tests with IBM sort programs, SyncSort will yield savings that look like this:

Resource Savings



2. HIGHEST HONORS IN PRODUCTIVITY. SyncSort is a bonafide "programmer output stretcher." It includes a whole battery of labor-saving features – INCLUDE/OMIT, SUM, INREC/OUTREC, a special Report Facility, and many others. In typical selection-report applications or modifications, you can count on savings like this:

Programming Time



3. BETTER COUNSELING. We have the best customer service in the business. If you need expert advice on any aspect of sorting, it's available fast on an around-the-clock basis:



4. MOST POPULAR IN CLASS. Over the past decade, SyncSort has become the most widely used sort program in America. It's used by 42 of the top 50 companies on the Fortune 500 list, and by a major share of all sort-program users.

OVERSEAS REPRESENTATIVES—

Düsseldorf: SyncSort Technology GmbH, Tel.: 0211-480351
Johannesburg: Computing Benefits Ltd., (011) 46-5211
Melbourne: Shell Co. of Australia Ltd., (03) 8400311
Milan: SYNTAX, (39-2) 87. 74. 44
Paris: CAP/SOGETI Produits, 33-1-539-22-25
Reading (UK): SyncSort Technology Ltd., 44-0734-481919
Stockholm: BRA, 46 8 88 03 00
Tel Aviv: ADVANCED TECHNOLOGY Ltd., 442697
Tokyo: Software Engineering Co., Ltd., (03) 446 1811
Utrecht: SyncSort Technology BV, 030-31-26-11

WHITLOW

COMPUTER SYSTEMS Inc. 560 Sylvan Ave., Englewood Cliffs, N.J. 07632

Market Profiled For IBM 3270s, Top Competitors

(Continued from Page 1)

3270-compatible manufacturers.

However, after IBM doubled its 3270 production capacity last year, most products are now on a reasonable delivery schedule, IDC noted. While user demand will remain strong for these products, IDC forecast rough going for some 3270-compatible manufacturers during 1980 and 1981. The advantage these vendors had in being able to deliver products more quickly than IBM is diminishing, as are the price differentials on IBM's newer 3270 products, IDC maintained.

Industry Spotlight

Although top 3270 competitors are concerned about IBM's newborn aggression, particularly for 3276 and 3278 models, those interviewed by *Computerworld* recently cited healthy order rates at their firms.

The top six vendors account for 35% of compatible 3270 installations of CRT devices, according to IDC. These top six vendors are Raytheon Data Systems (76,000 units); ITT Courier (57,000 units); Telex Computer Products, Inc. (39,000 units); Memorex Corp. (35,000 units); Harris Data Communications Division (24,000 units); and Teletype Corp. (23,000 units).

IBM's 3270 product family spans two generations. The oldest products are the 3271 and 3272 control units and the 3277 display. Then, in 1977, IBM began Phase II of the product family with the introduction of the 3274 controller and 3278 display units.

The new group of products were designed to operate within IBM's System Network Architecture (SNA) and were 20% to 40% less expensive than former models, explained Terry Schmidt, product marketing manager for Harris Data Communications, a division of Harris Corp.

SNA compatibility is virtually a must for vendors who want to compete successfully in the 3270 marketplace.

Of the top six vendors, Harris Data Communications and Memorex have yet to adapt their product to an SNA environment. However, Schmidt said Harris' 9220 models, now in beta test, will feature SNA compatibility. Memorex's Klein said that firm is also considering SNA for its product line.

"Users are just starting to accept SNA. It's taken IBM a long time to put the parts together," noted Bert Hochfeld, Telex's director of planning and strategy.

Two Hot Buttons

Two other hot buttons in 3270-compatible machines today are increased functionality or "intelligence" and color terminal capability.

While IBM introduced its color display, the 3279, last year, to date none of its competitors has introduced a color display. However, all leading vendors interviewed said they were exploring color. Both the cost of making a color display and the relatively low demand level the product now has are deterrents to adding a color terminal to their product lines.

However, as the size of the screen is increased, users have to have a way of coding the information displayed, and one way is color, noted Barbara Ells, product marketing manager at ITT/-Courier.

Besides color, functionality, or increased intelligence, is an option vendors are contemplating. Most agreed that IBM's next generation of 3270 products, expected to be introduced next year, would offload more processing function on the terminal subsystem.

Those vendors whose products are device-compatible — devices that can be interchanged with IBM's 3270 products — have generally not added functionality to their replacement products.

However, vendors like Harris Data Communications and Raytheon Data Systems, which offer subsystem-compatible products, generally have built functionality into their offerings to gain a competitive edge over IBM. For example, by adding intelligence to its systems, the PTS-100 and the PTS-2000, Raytheon is able to sell into specialized markets such as airline reservations.

Users who opt for subsystem-compatible 3270 products must buy both the controller and the display from the same vendor.

Despite added functionality, 3270 vendors still essentially compete on price. Depending on the type of unit the user desires, prices are generally 10% to 50% less than comparable IBM 3270 products.

Price competition for leased equipment is less marked than for purchased equipment, vendors agreed. They do not see IBM putting the squeeze on lease prices. In fact, IBM has raised its lease prices, explained Milt Cooper, vice-president of marketing and sales for Raytheon's Intelligent Terminals Division.

The purchase price is where IBM exerts the greatest pressure, most recently offering users up to a 15% discount on volume purchases.

However, IBM's emphasis on making purchases attractive is bound to have a minimal impact on its competitors. The 3270 market is 62% lease and 38% purchase, just the reverse of other segments of the terminal market, Venture Development Corp. (VDC) noted. To remain competitive, vendors must offer comprehensive lease packages.

From a market standpoint, the 3270 market has passed its halcyon days. While remaining strong in terms of the number of units shipped, the market will grow more slowly than in previous years, VDC forecast. Instead, the fastest growing segment of the terminal market is now clustered processing stations, growing at 28% a year.

Moreover, the 3270 arena is experiencing healthy competition from Honeywell, Inc., Univac and Burroughs Corp., all of which combined are producing terminals in volumes larger than the 3270. IDC terms this the HUB market and notes opportunities for vendors who wish to offer terminals compatible to these mainframers.

IBM	HARRIS DATA COMMUNICATIONS DIV.[1]	ITT COURIER[2] TERMINAL SYSTEMS, INC.	MEMOREX CORP.[2]	RAYTHEON DATA SYSTEMS[1]	TELEX CORP.[2]	TELETYPE CORP.[1]
3271 Control Unit	8171, 8181[3]	2711	1371	PTS-100	271	40/4, 4540
3272 Control Unit	8172, 8182[3]	2721	1372	PTS-100	272	—
3274 Control Unit	8171, 8181[3] 8182[3], 9210	7411	—[6]	PTS-100 PTS-2000	274	—
3275 Display Station	8175	2750	—	—	275	40/4
3276 Control Unit Display Station	8171, 8181[3]	7601	2076	PTS-2000	276	—
3277 Display Station	8171, 8172 8181, 8182 8175, 9210	2770[4] 2700, Model 3[4]	1377	PTS-100	277	40/4 4540
3278 Display Station	9210	2780[4] 2700 Model 13[4]	2078	PTS-100 PTS-2000	278	—
3279 Color Display Station	—	—	—	—	—	—

1. Vendor's equipment is subsystem-compatible. This means individual components of the 3270-compatible system cannot be interchanged with IBM 3270 devices.
2. Vendors equipment is device-compatible. This means individual components of the 3270-compatible system can be interchanged with IBM 3270 equipment.
3. The 8181 and 8182 models support special enhancements not found in comparable IBM equipment. This includes queued transaction handling, local format storage and spooled print.
4. Device-compatible.
5. Subsystem-compatible.
6. Under development.

IBM 3270 and Major Competitors' Compatible Offerings

	IBM	HARRIS DATA COMMUNICATIONS DIV.	ITT COURIER TERMINAL SYSTEMS, INC.	MEMOREX CORP.	RAYTHEON DATA SYSTEMS	TELEX CORP.	TELETYPE CORP.
SDLC	All Controllers	All Subsystems	7411 A&C 7601, 2711	Displays can operate with SDLC devices, but Memorex's controllers do not run under SDLC.	All Subsystems	271 275 276	4540
SNA Compatibility	—	9210, 9220 models will be SNA-compatible. To be introduced in the near future.	7411 A&C 7601, 2711	No — currently under consideration.	All Subsystems	276	4540

SNA and SDLC Compatibility

Competition Looks Ahead, Sees Intelligence Added

By Marcia Blumenthal
CW Staff

What will IBM's new generation of 3270 products look like next year?

Most 3270-compatible vendors agree IBM will add functionality to its control unit, making the products more tuned to the distributed processing environment. Other changes will primarily be human engineering refinements.

IBM will add more off-line functions, Terry Schmidt, product marketing manager of Harris Data Communications Division, predicted. Moreover, he expects IBM will offer a range of screen sizes for its terminals. The 3278 screen is still pretty large and does not allow for applications where space is limited, he said.

While agreeing that IBM would pursue added functionality, Bert Hochfeld, Telex Computer Products, Inc.'s director of planning and strategy, has a hunch IBM will also try to incorporate its inexpensive 3101 dumb terminal into the 3270 environment. And IBM will try to introduce a different printer technology, he said, adding that the printer is the key constraint in terminal systems.

At Teletype Corp., Charles Pedler, vice-president of strategic planning, speculated that IBM would gear its terminals to the word processing function, hoping to become a major player in the office automation market.

A recent study by Venture Development Corp. noted that for the next five years, terminals will be used for pretty much the same user applications except for word processing, which will account for 13% of applications by 1984 — up from 4% last year.

However, IBM will not add so much functionality that it will jeopardize its second generation of 3270 products now being shipped in record numbers, noted Milt Cooper, vice-president of marketing and sales for Raytheon Data Systems' Intelligent Terminals Division.

Industry Spotlight

Raytheon Data Systems

NORWOOD, Mass. — Raytheon Data Systems (RDS), with an estimated installed base of 76,000 IBM 3270-compatible systems at year-end 1979, is second only to IBM in this marketplace, with a market share of 10.6%, according to statistics compiled by International Data Corp.

Part of the $4.3 billion Raytheon Co., RDS produces two products that are subsystem-compatible with IBM's 3270 line. Its two major systems are the PTS-100 and the PTS-2000.

The PTS-100 emulates IBM's 3271, 3272 and 3274 controllers and can operate in a Systems Network Architecture (SNA) environment, Cooper said. Although the PTS-100 is currently the firm's mainstay 3270-type product, its newer PTS-2000, also SNA-compatible, is the architecture for the 1980s, Cooper said. It will be the basis of all product extensions such as use for word processing.

The PTS-2000 system is a small cluster configuration similar to the 3276, but can be field-upgraded to larger clusters, accommodating 32 devices. Besides adding its own functionality to the system, Cooper said, RDS will follow all key functional enhancements made by IBM.

On a two-year-lease basis, RDS' systems are priced 23% to 25% less than IBM's 3270 products, Cooper claimed. All PTS products can be delivered in 30 days, he added.

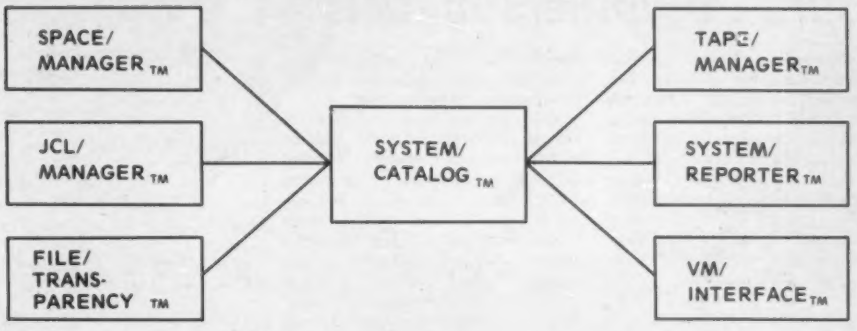
3270-TYPE CRT DISPLAYS INSTALLED YEAR-END 1979

IBM	370,000
Raytheon Data Systems	76,000
ITT Courier Terminal Systems, Inc.	57,000
Telex Corp.	39,000
Memorex Corp.	35,000
Harris Data Communications Div.	24,000
Teletype Corp.	23,000
Honeywell, Inc. (Incoterm)	19,000
Management Assistance, Inc. (Wordstream)	19,000
Computer Optics Corp.[1]	11,000
Mohawk Data Sciences Corp.	11,000
Northern Telecom Systems Corp.	11,000
General Telephone and Electric	8,000
Bunker Ramo Corp.	7,400
Four-Phase Systems, Inc.	5,000

1. Acquired by Four-Phase in April 1980.

Source: International Data Corp.

FRUSTRATED WITH DOS/VS(E)?



The System/Manager™ is the Solution! ©

SYSTEM/MANAGER is the only fully integrated DOS/VS(E) Resouce Management system with a single catalog and associated utilities for both disk & tape data set management. By automating resource management, SYSTEM/MANAGER allows your operations personnel to run your system at maximum capacity with far fewer errors. By simplifying and expanding DOS/VS(E) JCL, SYSTEM/MANAGER increases programmer/operator productivity. And, as an added bonus, it reduces your disk space and tape requirements. Thus SYSTEM/MANAGER relieves operational frustrations, saves personnel & computer time, reduces costs, and generally improves your D.P. environment. To learn how, call or write us today.

I'd like to learn more -- ☐ Please Call ☐ Please Send Details on how System/Manager can help us.

Name_____
Title _____
Company _____
Street_____
City _____ State _____ Zip _____
Phone: A/C ( ) No. _____
Hardware _____
Operating System _____
S/M 300.0

dataPro HONOR ROLL

INSAC

INSAC SOFTWARE INC.

2300 Peachford Road • Suite 3235
Atlanta, GA 30338 • (404)452-7676

Industry Spotlight

• ITT Courier •

TEMPE, Ariz. — ITT Courier Terminal Systems, Inc. produces a complete range of IBM 3270-compatible products. In addition, the firm manufactures synchronous terminals that support Honeywell, Inc.'s VIP protocol and supplies the point-of-sale terminals for 25% of 16 stoves in McDonald's hamburger empire.

Aquired by the $22 billion ITT Corp. in April 1978, ITT Courier has sales estimated in the $100 million to $150 million range. Among 3270-compatible makers, the firm ranks second with a total of 57,000 CRT displays installed at the end of last year, according to International Data Corp. (IDC). IDC estimated the firm holds a 7.9% share of the 3270-compatible market.

The company's strategy is simple and direct — to match IBM's entire 3270 product line with device-compatible equipment. "As long as the IBM host does not support additional functions, we will not," noted Barbara Ells, product marketing manager.

IBM is pushing color capability, she observed, adding, it would be reasonable to assume ITT Courier would offer a 3279 type product.

Handsome Payoff

The firm's product strategy has paid off handsomely. The company grew at a 50% rate last year, but for the previous five years grew 70% annually, she noted.

Some 75% to 80% of the firm's business is from add-on equipment, with the remainder coming from new customers.

ITT Courier is part of ITT Telecommunications and Electronics Group, comprising 40% of ITT's total revenues.

• Telex Computer Products •

TULSA, Okla. — Within the past year, Telex Computer Products, Inc. has rounded out its 3270-compatible product line and now offers device-compatible replacements for IBM's entire 3270 family.

In addition, Telex has added Systems Network Architecture (SNA) compatibility to its 276 (IBM 3276) control unit and will be extending SNA compatibility, Bert Hochfeld, director of planning and strategy, noted.

Telex gained its footing in the 3270-compatible market through its 1976 acquisition of Terminal Communications, Inc.

Since then it has installed 39,000 CRT displays, garnering 5.4%, of the 3270 market, the third highest of IBM 3270-compatible vendors, according to International Data Corp. (IDC).

Costs associated with the introduction of a slate of new 3270-type products in the past year contributed to the negative impact on Telex's earnings. For its latest fiscal year ended March 31, Telex had sales of $165.9 million, up from $148 million in the prior year. However, earnings dropped to $991,000, down from $5.3 million in the prior year. Telex contributes about two-thirds of the total revenues of the parent company, Telex Corp.

While Hochfeld was candid about the damage IBM price decreases could do to Telex and other vendors, he noted IBM has recently raised lease prices. Nonetheless, "a rental of $70 per month for a device is a number which is hard to get under." Telex currently leases its displays for $63 on a two-year plan, he said.

The Terminal Communications Division contributes 60% of Telex's revenues. Its 3270 product shipments are growing at 30% annually, Hochfeld estimated. These products are the backbone of the division.

Although Telex's 270 product line is device-compatible with IBM's 3270 products, Hochfeld is particularly bullish about the distinguishing characteristics of the company's 3287-type 287 printer introduced at the National Computer Conference in May.

Telex's prices are 10% to 30% below IBM's levels. Its 276 (IBM 3276) and 278 (IBM 3278) can be delivered within 45 days. However, the wait for printers is somewhat longer, he said.

STRUCTURED SYSTEMS ANALYSIS & DESIGN

4 DAY SEMINAR/WORKSHOP

FEE: $525 Includes all materials and luncheons. Discounts Available for 3 or more participants

WHERE
Los Angeles, CA.
Portland, OR.
San Francisco, CA.

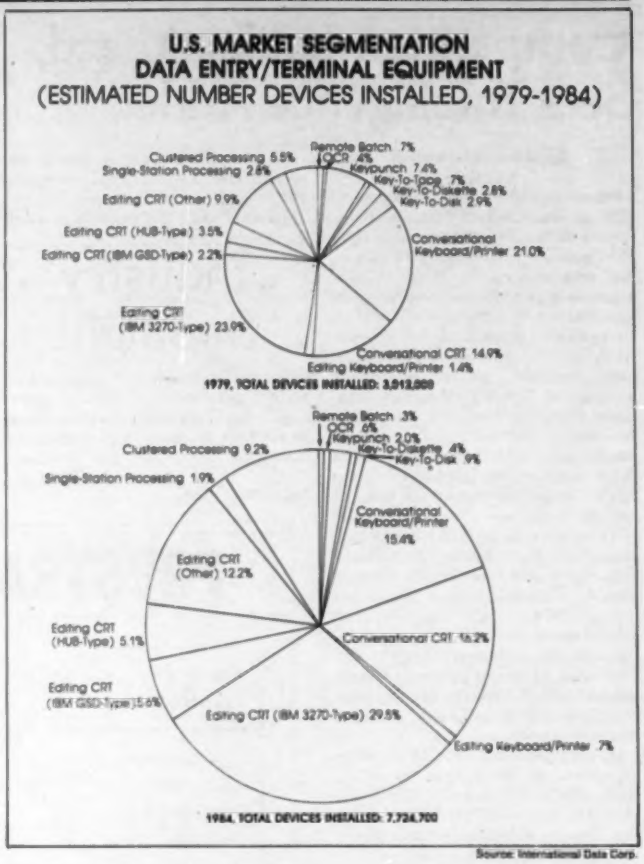
WHEN
October 27-30
December 1-4
January 19-22

Many organizations are using this highly practical structured approach. Our techniques enable Users and Systems Professionals to create better systems. We would be glad to send you a brochure that describes the seminar/workshop.

Call or Write Jane Crosswhite at:

OBERLAND Associates

4036 NE Sandy Blvd. • Portland, OR 97212 • (503) 281-3000



Source: International Data Corp.

• Memorex Corp. •

SANTA CLARA, Calif. — Of the top three device-compatible 3270 vendors, Memorex Corp. is the only firm not to offer users a 3274 control unit, a 3275 display unit or Systems Network Architecture (SNA) compatibility.

While Memorex probably will not offer a 3275 product, its 3274-compatible product is under development, according to Paul Klein, vice-president of marketing within the Communications Group. Moreover, the firm is working on SNA compatibility, he noted.

Although interested in marketing a color terminal, Memorex is waiting to see how the 3279 models will evolve, George Everhart, manager of product planning, explained. Memorex expects a lower price version of the 3279 in the not-too-distant future.

Despite lapses in product line and capability, Memorex as of last year had 35,000 of its 3277-type 1377 CRT displays installed, according to International Data Corp (IDC). Memorex introduced this product in 1976.

With a $21 million loss for the first two quarters of its current fiscal year, industry analysts have repeatedly questioned Memorex's ability to compete in IBM-compatible markets.

But Memorex's 3270-type products account for 60% of the Communications Group's revenue, Klein noted.

On a price basis, Memorex's lease terms are 95% of those of IBM, and purchase prices are 25% below IBM's. The company's 3277-type 1377 display is on immediate delivery status.

• Harris Communications •

DALLAS, Texas — Harris Data Communications is the largest division within the Information Systems Group of the $1.3 billion Harris Corp. The firm entered the 3270 market in 1977 through the acquisition of Sanders Data Systems, a division of Sanders Associates, Inc.

Harris produces two major 3270-compatible subsystems — the 8000 and 9200. Its 8000 line is targeted towards IBM's first-generation 3270 bisynchronous transmission products, which currently represent the major portion of the market, Terry Schmidt, product marketing manager, explained.

However, this market will shift to the Systems Network architecture (SNA) environment during the next five years and the firm's newer 9200 product line will target the SNA environment. Its first entrant in the SNA world, the 9210, is currently in beta test.

Aside from enhanced functions not found on IBM 3270 equipment, such as local format storage, Harris early on decided to increase production capability, knowing this was a key tactic for making inroads on IBM. Currently the firm can deliver its systems in 45 days.

At the end of last year, Harris had 24,000 3270-type CRT displays installed, taking fifth place among IBM's competitors, with a 3.3% share of the market, according to International Data Corp.

Although Harris' delivery time is highly competitive, its prices are higher than most other 3270-compatible vendors, generally 10% to 12% below IBM.

FAA May Dismiss Controller for Tampering

By Marguerite Zientara
CW Staff

NEW YORK — The Federal Aviation Administration (FAA) has moved to dismiss an air traffic controller for allegedly removing data from computerized radarscopes and contributing to the "potential endangerment" of a Soviet jetliner approaching Kennedy International Airport last January [CW, Feb. 11].

Gerald F. O'Brien is the first controller ever to be charged with tampering with air traffic control equipment, according to an FAA labor relations spokesman. A second controller, Richard E. Kelsey, faces a possible 30-day suspension on charges that he was "negligent by not controlling the use of equipment" under his jurisdiction, according to an FAA spokesman.

The announcement of the FAA action indicated that "important flight data" concerning a Soviet Aeroflot airliner, on which Ambassador Anatoly Dobrynin was a passenger, had been "deliberately erased" as the aircarft approached Kennedy on Jan. 18.

The announcement said that "precise deliberate keyboard entries" had been made "at a specific control position" during the incident.

The occurrence came at a time when the local chapter of the Professional Air Traffic Controllers Organization (Patco) was publicly opposing the handling of Soviet or Iranian planes because of the Soviet intervention in Afghanistan and the holding of American hostages in Iran.

The incident reportedly occurred during a shift change at Kennedy's Common Instrument Flight Rules (IFR) Room, when the supervising controller became aware that the Aeroflot jet's radar blip carried no computer-generated alphanumeric identifying data block, indicating airline, flight number, altitude and ground speed, according to the FAA spokesman.

When the supervisor called the Air Route Traffic Control Center (ARTCC) in Islip, L.I., to clarify the situation, center personnel indicated the air sector in which the Aeroflot jet was flying.

"But there was another plane [in that sector]," the spokesman explained. "[The supervisor] punched back the data block, but he put it on the plane that was closer in, and because it was closer in, he ordered it to descend."

Jet Descended Early

That error resulted in the Aeroflot jet's descending 10 miles too early in the normally crowded skies over Long Island. "There was no other traffic in the area, so there was no danger," the spokesman noted, "but if there had been other traffic in the area, there possibly could have been some danger."

After a Federal grand jury in Brooklyn decided in August that there was no probable cause for bringing criminal charges against O'Brien, Common IFR Room Facility Chief Russell Shedd requested that a special FAA committee investigate the matter, resulting in the recent charges.

Legal experts stressed that the burden of proof is less stringent in a civil administrative proceeding. The accused men have 20 days from notification to reply "before final decisions are made by the agency," the FAA spokesman said.

The two controllers, who reportedly have served notice of their intention to appeal the charges, were not available for comment.

SNA Viewed Trap for Users

(Continued from Page 1)

later. SNA compatibility will also be a prerequisite for users who want to avail themselves of the latest versions of IBM's most widely used software products like IMS.

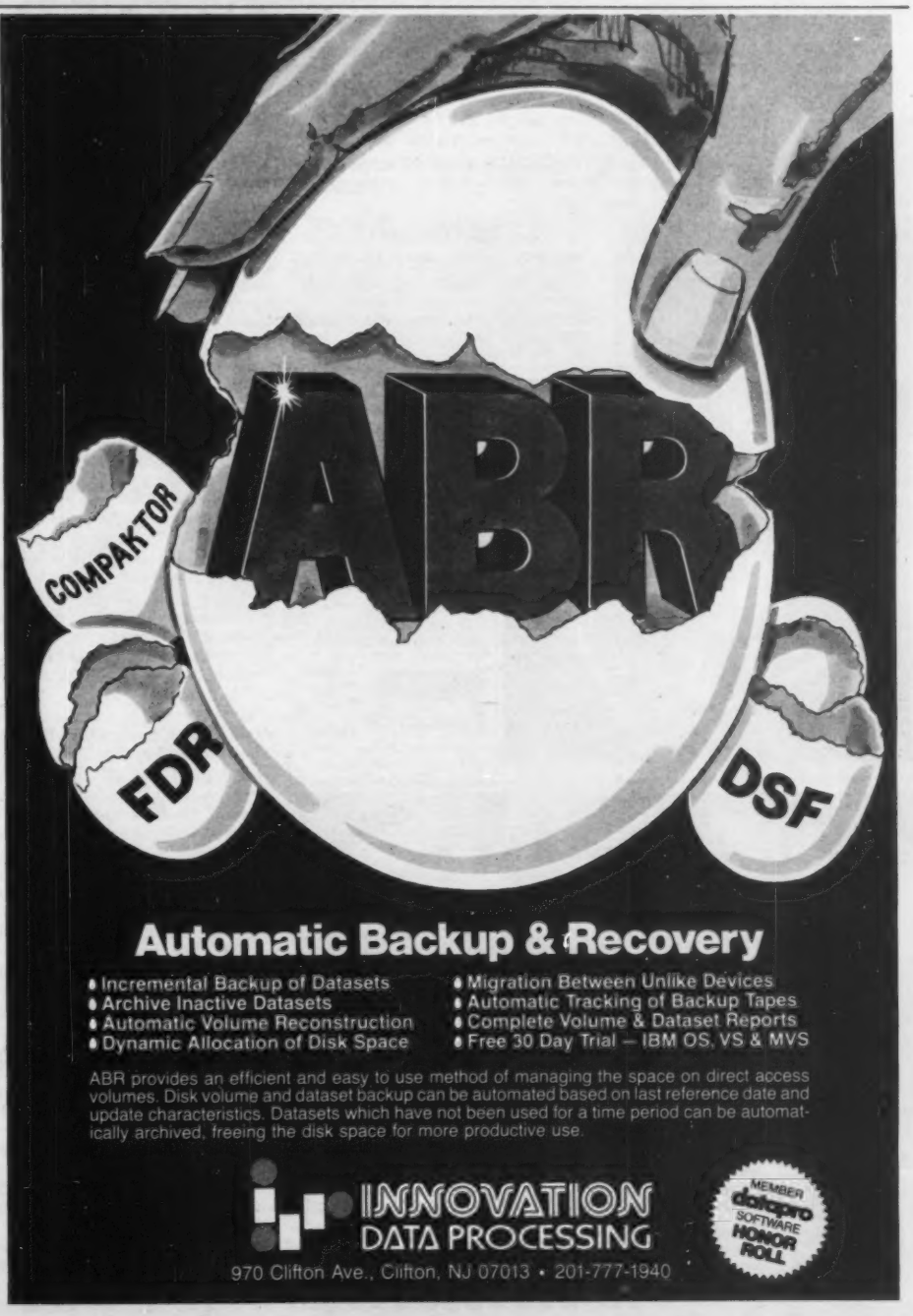
"For most users, the question of whether to convert to SNA is no longer an issue," Kar said. "The only question left is when the conversion will take place. IBM long ago put its customers on notice that they would eventually have to switch to SNA if they wanted to continue to operate within an IBM environment."

One of IBM's main objectives in introducing SNA is reportedly to make life difficult for plug-compatible manufacturers (PCM).

In response to what it apparently sees as a major PCM threat, IBM during the last few years has embarked on a new business and technological strategy that it hopes will reverse its recent market setbacks and propel it toward its goal of becoming a single-source vendor.

One of the cornerstones of IBM's plan to "lock" users into its own product line is SNA. In the past, PCM peripherals required little more than compatibility with IBM's Synchronous Data Link Control (SDLC) to communicate with the company's mainframes.

But in today's SNA environment, the interfacing requirements for non-IBM hardware modules are infinitely more difficult and complex. True, plug-compatible peripherals operate just as effectively in an SNA network as they do with the bisynchronous or start-stop protocols. But under SNA, existing PCM equipment has to be significantly modified and upgraded before it can be connected to an IBM-based network, Kar said.



Between 1967 and 1971

Doctor Says IBM TNF Tests 'Poorly Designed'

By Bruce Hoard
CW Staff

DURHAM, N.C. — Tests on trinitrofluorenone (TNF) commissioned by IBM and conducted by Hazelton Laboratories, Inc. between 1967 and 1971 were "poorly designed" and "inconclusive," according to Dr. Hans L. Falk, assistant director of health hazard and assessment at the National Institute of Environmental Health Sciences (NIEHS). NIEHS is a division of the Department of Health, Education and Welfare.

The Environmental Protection Agency (EPA) has also issued a highly critical evaluation of the Hazelton tests. IBM refuses to release scientists at Hazelton from their vow of confidentiality so they might be questioned about the tests.

Falk was asked to evaluate the carcinogenicity of TNF by Dr. David Axelrod, New York state commissioner of health. The request came after employees at that state's Department of Social Services refused to operate IBM's 3800 laser printer — which contains TNF — until the machine was certified safe [CW, Sept. 22].

In his reply to Axelrod, Falk complained that he had been supplied with a paucity of relevant information and had solicited more from IBM, which he received.

The director was anything but timid in denouncing the Hazelton tests. "The information given me makes it apparent that the tests were poorly designed and even if the full report had been available, it would not have led to the conclusion that TNF is noncarcinogenic," he wrote.

"I am very disappointed in the fact that apparently Hazelton carried out these inconclusive studies. The conclusion that can be reached is that carcinogenicity of TNF could not be demonstrated because of faulty design of experiments or reporting of results.

"The time period of the tests was too short to come to any conclusions. You can't cut the experiment off, you have to go on," Falk said. Comprehensive carcinogenicity tests in animals should take at least two years, he added.

Hazelton's longest tests were 18 and 21 months, respectively. From there, they dropped to one year, six months, four months and 24 to 72 hours. In Falk's opinion, that was not enough.

"As it is now, IBM has no data to prove TNF is not a carcinogen," he said.

EPA Concerned

NIEHS is not the only federal agency to express concern over IBM's Hazelton tests.

Referring to a negative six-month Hazelton inhalation study in one of its two TNF status reports, the EPA said "Because of the relatively short duration of the exposure and the use of only the mouse as the test species, this study does not provide an adequate basis to judge the carcinogenic or tumoregenic potential of TNF or CTC via inhalation exposure."

The agency went on to request more information from IBM in seven categories, including "Ames" tests results, inhalation test results and the fate of TNF after being transferred onto the 3800's hard-copy output. The Ames test is a short-term study used to determine mutagenicity.

The EPA received the latest round of IBM documents on Sept. 21 and has confirmed that new information in all its areas of concern was included. It has not, however, yet evaluated the documents.

Computerworld also acquired the recent IBM release and through examination has discovered the company upped its estimation of the amount of TNF found on hard-copy output by 25%. (See accompanying story.)

EPA Calls IBM Initial Filing On TNF Data 'Insufficient'

(Continued from Page 1)

However, when pressed for more information, IBM recently submitted documents that showed its scientists conducted Ames tests in 1978 with the same basic conclusions as those found in 1980 by SRI.

In addition, IBM admitted in its follow-up submissions that it had underestimated the amount of trinitroflourenone (TNF) that would be left on copies from the 3800 printer by 25%. The released data indicates TNF is also found in the air around the operator stations of that machine.

First Tests

TNF was originally identified as a possible carcinogen in the '50s and IBM conducted a series of tests (see related story) in the late '60s on the chemical leading it to the conclusion that TNF would not pose a health hazard in its copier products that used the chemical.

However, the same Charge Transfer Complex used in the copiers was later put into the laser printer — the 3800 — in a "geometry" that "is considerably different." Therefore, in 1978, the firm began testing the printer for the presence of TNF around the machine and on the output paper.

The tests were apparently conducted by different groups within IBM with some groups unaware of work by other groups. For example, tests reported in April 4, 1978 memos reach different conclusions than those reported a week earlier by a different group.

In addition, in its latest filing to the EPA, IBM claims a May 2, 1978 memo was the earliest "documented use of the Ames test as a quantitative method," but the filing itself contains a memo that shows such a use by IBM scientists two months earlier — with a finding that TNF was detectable around the machine in question.

The Ames test is a quick method used to determine if chemicals are mutagenic. Experts say 90% of the chemicals found to be mutagenic are also carcinogens.

In the March 1978 memo, IBM scientists reported that "in the course of screening many chemicals using the Ames . . . test, it was discovered that [TNF is] highly mutagenic."

Moreover, that study indicated that the test "can be used as a quantitative analytical tool for detecting TNF in various components and samples collected from the 3800 printer."

Finding that TNF was a "potent mutagen," the researchers went on to show that "TNF can be detected on the [copier] and also in all used toner samples."

Then, in 1980, IBM had the same Ames tests run by SRI with the same results — except in one important discrepancy.

SRI found that TNF was positive in the tests, but more importantly it found that "the response for a given concentration is approximately twice that obtained by IBM."

SDI 'Extension' Denied by Firm

By Marguerite Zientara
CW Staff

SAN MATEO, Calif. — SDI, Inc., which recently changed its software leasing policies to compulsory two-year contracts instead of the previous month-to-month lease option [CW, Sept. 8], did not grant Affiliated Foods, Inc. here an "extension" of the generally required 30-day notification period, an SDI spokesman said.

While it was reported that SDI "knuckled under" to Affiliated under the threat of a legal injunction [CW, Sept. 29], that was "not really" the case, according to SDI's Michael Miller, manager of advertising and promotion.

"Affiliated Foods was an old customer, and they had a 1974 contract including 'General terms and Conditions' which required 60 days' notice by either party [before termination of the contract], and the new 'General Terms and Conditions' states 30 days.

"[Affiliated Foods'] attorney sent us a letter explaining the situation, that he had discovered that under the old 'General Terms and Conditions' they had 60 days, and we said fine, we'll certainly honor that," Miller added.

Affiliated's DP manager, Joe Vail, contended, however, that while SDI did eventually honor the 60-day contract upon receipt of a letter from Affiliated's lawyer, Affiliated had previously notified SDI of the oversight by telephone.

While it was previously reported that Vail felt SDI "showed a wanton disregard [for its customers]" [CW, Sept. 29], Vail stressed that the disregard extended only to Affiliated.

FOR $2,245, MFE GIVES YOUR NCR CASSETTES FREEDOM OF SPEECH.



MFE's CASSETTE READER.
Read and transfer data from your NCR cassettes to almost any computer using our Cassette Reader's RS 232C interface or 20 MA TTY. Send us a cassette. We'll send you a free print-out to prove it.
Find out more.
Call TOLL FREE: 800-258-3884. Distributor inquiries invited.
Or write MFE Corporation, Keewaydin Drive, Salem, NH 03079
MFE

CICS/VS
COMMAND LEVEL PROGRAMMING COURSE
October 20-27, 1980 • 9 AM to 5 PM
This course is intended for application programmers destined to develop application programs under CICS/VS using the command level interface.
• Develop and maintain CICS/VS command-level application programs
• Determine the trade-offs for the best use of the various CICS/VS facilities
• Make use of the basic input/output facilities of BMS as they relate to the IBM 3270 IDS or 3270 compatable terminals
Call COLLECT or write for complete information:
compEd
(212) 921-8676
1133 Ave. of the Americas, New York, N.Y. 10036
A subsidiary of Spindels & Associates, Inc.
Early registration recommended.
Courses based upon Monday-Friday schedule
yes, Please send more information & registration forms.
Name
Co.Name
Address
City State Zip
106

HP 9825A Helps Sail Freedom to Cup Victory

By Tim Scannell
CW Staff

NEWPORT, R.I. — Aided by a computer-based navigation system and years of sailing savvy, the U.S. 12-meter yacht Freedom successfully defended the America's Cup title recently, beating the Australian entry four times in a seven-race series.

Although sailing purists may scoff, the Hewlett-Packard Co. 9825A desktop computer installed in the cockpit of the yacht and linked to virtually every one of Freedom's navigation instruments, had a lot to do with the American victory. The computer tracked apparent wind speed and direction, true wind speed and direction and advised the yacht's captain, Dennis Conner, on what course to take.

During the more than 24-mile race, the seagoing computer may be used as often as 100 times per hour, according to Halsey Herreshoff, Freedom's navigator. One day "all serious contenders will use computers, because they allow us to do more work in a given time with more precision," Herreshoff said, calling the machine his "constant adviser" during the America's Cup campaign.

Most of the software for the shipboard system was developed by Herreshoff and Peter Lawson, a heralded navigator and computer programmer. Lawson started writing programs for the America's Cup races in 1977 when he discovered that computers used then had only a 60% reliability. All of the programs used in this year's trials and final races were adapted for the design and sail characteristics of the Freedom yacht.

Lawson also had a hand in selecting the HP computer, which is basically just off-the-shelf hardware. The computer is shielded from the elements by a plastic bag and sits below deck within reach of navigator Herreshoff.

The computer shows information via 16 Rochester Instruments Co. liquid crystal displays on the machine's console. Those particular displays were selected because liquid crystal readouts are easier to see in the water's glare, Lawson stated.

"The biggest complaint I have against the 9825 is that the damn thing isn't waterproof," Lawson said.

While the computer does analyze data more quickly than the navigator can and determines, for instance, the correct time to tack, Freedom's crew strongly insists that the America's Cup is not a race between computers. However, there are some people who believe that computers should not play so heavy a role in the races.

At the end of the America's Cup trials, for instance, when Courageous was defeated, the yacht's captain, Ted Turner, vowed never to participate in the races again because they had become too wrapped up in technology and did not concentrate enough on traditional techniques of sailing.

Specs Unveiled For Ethernet

(Continued from Page 1)

The means to apply maintenance and diagnostic software to Ethernet equipment are expected to be specified by "early next year," a spokesman said.

During the summer, project members have been meeting with an Institute of Electrical and Electronics Engineers (IEEE) subcommittee, which is developing standards for local-area networks [CW, Aug. 25].

The Ethernet Specification is said to be similar to the Class I service that has been discussed by the IEEE committee. The three companies will submit the specifications for the committee's consideration at IEEE's October meeting.

Unique Address

In the Ethernet system, each system element has a unique 48-bit address. Information is transferred serially in groups of bits called frames. The frames include the data to be sent, the address of the unit that will receive it and the address of the unit sending it.

Each transceiver monitors the cable before transmission to be sure it is not in use and during transmission to detect interference, the spokesman said. If there is interference from a transmission by another element, the frame is sent again when the cable is clear. To receive data, each element recognizes its own address, accepting frames with that address and ignoring the others.

Under the specifications, Frame Format features include a Preamble that enables bit synchronization and marks frame boundaries; Destination Address, consisting of a 48-bit field with 2^{47} physical addresses, one broadcast and $2^{47}-1$ multicase group addresses; and Source Address, in the same format as destination address.

The Frame Format also includes a 16-bit field to designate higher-level protocol types; an Info Field including 46- to 1,500 bytes of user data; and 32-bit Cyclic Redundancy Check (CRC) to protect destination, source, type and information fields.

An End-of-Frame feature guarantees cessation of the carrier after the last data transition and the Minimum Frame Spacing is 9.6 microsec, providing time for receivers to reset.

Copies of the Ethernet specifications may be obtained from the Ethernet Literature Departments of any of the three firms: DEC at 1925 Andover St., Tewksbury, Mass. 01876; Intel at 3065 Bowers Ave., Santa Clara, Calif. 95051; and Xerox at 3333 Coyote Hill Road, Palo Alto, Calif. 94304.

Here's a complete COBOL training package that costs only $150...

but it's guaranteed to outperform any competing package at any price

In the last two years, hundreds of DP professionals have used our COBOL texts for inhouse training with good results. Yet, we've had the uneasy feeling that the training results would be even better if we could provide the right supporting materials. Now, these materials are available in the *COBOL Advisor's Guide*. Combined with our two COBOL texts, a new book on Report Writer, and a reference manual, this *Guide* completes a training package that will help you conduct COBOL courses at any level, from beginning to advanced...all for $150.

The COBOL Advisor's Guide



- 320 pages
- 14 tabbed sections
- 8-½ × 11 inch, 3-ring binder

This *Guide* has everything you need to run an effective training program using any of our COBOL texts: *Part 1* of *Structured ANS COBOL; Part 2;* and *Report Writer*. It provides materials such as...study plans for each text ...forms for monitoring progress... tests...transparency masters...7 case studies that force a student to use the elements and techniques presented in the texts...test data and guidelines for administering the case studies...and complete case study solutions, including structure charts, COBOL code, and test run results. So whether you're training one programmer or many, I'm confident this *Guide* will improve your training results and save you many hours of preparation time to boot.

Structured ANS COBOL



- 498 pages
- 10 chapters
- 458 pages
- 11 chapters

This two-part course in structured COBOL is guaranteed to develop outstanding programmers. Part 1 teaches a professional subset of COBOL that includes sequential file handling on tape and direct-access devices. Part 2 covers advanced COBOL subjects like SET and SEARCH for table handling, subprogram linkage, the COPY library, indexed file handling, and the sort/merge feature. And both books present practical methods for designing, documenting, and coding structured programs, so they can be used independently as well as in a set.

Report Writer

If you've always thought Report Writer was too inefficient or hard to use, this is the book for you. In 128 pages, you'll see how the use of Report Writer can simplify the structure of a program, reduce coding by 30% and more, and speed up debugging. You'll learn how to use Report Writer in all its variations. Equally important, you'll learn *when* to use it so it's most effective. And you'll become familiar with seven complete Report Writer programs...programs you can use as models when you develop new programs on your own.



The Structured Programming Cookbook

- 221 pages
- 16 tabbed sections

This reference manual presents standards and guidelines for every phase of program development in a COBOL shop. It also contains complete documentation—including specs, design, and code—for four business programs...documentation that can save a programmer many hours of effort when developing a new program. As a result, it's a real productivity tool for a COBOL shop.

Our Guarantee

So there's no risk to you, we offer this unique, two-part guarantee. First, take up to 30 days to review the books without paying anything. If you don't like them, return them and forget the bill...no questions asked. Second, if you ever feel our books aren't effective, you can return them for a full refund, no matter how long you've had them.

So order today. You save $12.50 when you order the entire package...that's like getting the Report Writer book free. But if you'd rather order separately, the individual prices are listed on the coupon. And if you'd like to know more about the books before you order, call us collect at 209-268-8438.

Mike Murach & Associates, Inc., 4222 W. Alamos, Suite 101, Fresno, CA 93711

Dear Mike: Please send me the books indicated below. I will take up to 30 days to review them and hold you to your guarantee. I understand I will be billed the appropriate price plus freight (and sales tax in California) for each book or package of books ordered.

Quantity

_____ **The Complete COBOL Package,** 4 books and the Advisor's Guide for $150
_____ **The COBOL Advisor's Guide,** $100
_____ **Structured ANS COBOL, Part 1: A Course for Novices,** $17.50
_____ **Structured ANS COBOL, Part 2: An Advanced Course,** $17.50
_____ **Report Writer: A COBOL Feature That Can Improve Productivity,** $12.50
_____ **The Structured Programming Cookbook,** $15

Name & Title _____
Company (if any) _____
Address _____
City, State, Zip _____

SAVE: Send cash with your order, and we'll pay the freight. California residents, please add 6% sales tax to your order total. (Offer valid in the U.S.)

COB-1

Threat to U.S. High-Tech Leadership

Drive to Split IBM a 'Dumb Move,' TCA Told

By Jeffry Beeler
CW West Coast Bureau

SAN DIEGO — Efforts to split IBM into several smaller independent firms threaten to do the U.S. more harm than good and can be described fairly as a "dumb move," a top executive with a leading aircraft manufacturer warned here recently.

Not too many years ago, the U.S. enjoyed unquestioned world supremacy in most of its heavy bellwether industries like steel and autos. Today, however, the country's dominance in those key industries is being whittled away steadily by its more productive foreign competitors, particularly Japan and West Germany.

Only in computing, telecommunications and a few other isolated fields does the U.S. still maintain a position of international leadership, if not preeminence. But now, the country's computing and high-technology base appears to be heading toward the same sad fate that has already overtaken its steel and auto manufacturing companies.

Ironically, much of the threat to the nation's high-technology competitiveness is originating, not from overseas, but from forces operating right here in the U.S., according to Jaime Oaxaca, vice-president and assistant general manager of Northrup Corp.'s Electromechanical Division.

As a case in point, Oaxaca cited the federal government's persistent efforts to break up IBM into several independent and, therefore, comparatively weak divisions. IBM undoubtedly forms the cornerstone of the U.S.' high-technology might, and to slice the company into several competing entities would severely hamper the domestic computer industry's ability to meet stiff overseas competition, the Northrup executive warned.

Champion of Free Enterprise

Oaxaca, an electrical engineer by training and a self-described champion of the free-enterprise system, aired his views at the Tele-Communications Association's (TCA) 18th annual conference, here.

That show was billed as the largest and most heavily attended in TCA's history. During its four-day run, an estimated 3,500 visitors, including some 2,700 walk-ins, were expected to jam the conference's product-exhibit area, where approximately 90 hardware and services vendors displayed their wares in nearly 200 booths.

Exhibitors represented both the voice and data sides of the rapidly expanding telecommunications field.

In keeping with its overall theme — "Telecommunicators' Key to the Future: Education Plus Technology Plus Management" — the show complemented its product exhibit with a limited program of educational seminars. Altogether, the program consisted of six seminars covering such topics as future systems, goal setting, the need for educating top management, international communications, communications security and telecommunications management.

Rounding out the technical seminar program were five panel sessions dealing with government regulation of the communications field, educators, automated office systems, future telecommunications offerings and teleconferencing. Both the panel sessions and the educational seminars were restricted to TCA members only.

Final Highlights

One of the show's final highlights was a post-conference election in which TCA members were scheduled to vote on a petition to add a San Diego chapter to the group's existing organization. If approved as expected, the proposal would increase the TCA family of chapters to five and would expand membership to 1,175.

TCA currently includes some 900 members divided among four chapters, one each for the Arizona, Northern California, Southern California and Pacific Northwest regions.

As their keynote speaker, TCA conference organizers selected Oaxaca, who reminded his audience that telecommunications and telecommunications managers are heading rapidly into what he termed an "information age." The advent of the so-called information age will bring continued high inflation rates and an increased volume of minicomputer-based data communications between large firms.

The information age will also lay the technological foundation that will allow growing numbers of telecommunications managers and others to work at home instead of commuting each day to offices miles from where they live, Oaxaca said.

To prepare themselves for the problems and rigors of living and working in an information age, telecommunications managers should begin now to create a personal "market plan" detailing their long-term career objectives. They should then use the market plan as a yardstick against which to measure their future professional progress, he explained.

Telecommunications managers should also keep themselves professionally up-to-date through continuing education and make sure their companies improve efforts at career counseling, Oaxaca added.

THE MORE YOU KNOW ABOUT SOFTWARE PACKAGES, THE BETTER WE LOOK.

Comparing financial and manufacturing software before you buy goes beyond smart thinking. It's your assurance that the software you install now will be with you tomorrow, and beyond.

We invite direct apples-to-apples comparisons of our packages because we know they're good. 3,000 users worldwide is further proof that we're the leader.

Some software vendors can only support one or two types of computers with a limited number of products. We offer 87 different financial and manufacturing packages for 31 different models of popular computers. Whether you have a small or large ***IBM*** system, ***DEC, Honeywell, Hewlett-Packard, ICL, Perkin-Elmer, Prime, Univac*** or ***Wang***, we have your application software.

Financial packages include General Ledger, Accounts Receivable, Accounts Payable, Fixed Asset Accounting, Payroll/Personnel and Work Order Management. Manufacturing Resource Planning ranges from Material Requirements Planning, Master Production Scheduling and Capacity Planning to Shop Floor Control and Purchasing. They all produce the results knowledgeable computer users have come to expect from the leader in application software.

Call or write today. Because the more you know about software packages, the more you'll understand why we're the leader.

SOFTWARE INTERNATIONAL®

Elm Square, Andover, MA 01810 (617) 475-5040

Atlanta (404) 955-3705
Boston (617) 683-2447
Chicago (312) 298-3500
Columbus, OH (614) 773-2167
Houston (713) 444-3348
Los Angeles (213) 573-0402
New York (914) 253-8050
San Jose (408) 292-9700
Toronto (416) 924-1461
Vancouver (604) 669-6122

OFFICES AROUND THE WORLD

CALL US. WE'RE THE LEADER.

County Cuts Annual Election Costs by $75,000

By Marguerite Zientara
CW Staff

RIVERSIDE, Calif. — Because of declining hardware prices, more and more local governments are buying their own minicomputers for processing election returns in a move away from sharing a district's central CPU.

The benefits of such a switch from shared to dedicated computing power include greater local control of operations, faster job turnaround and new capabilities for information management, according to those who have made the change.

In addition, there are economic benefits. One such user, California's Riverside County, has reportedly reduced its election DP costs by $75,000 annually — from $200,000 a year to $125,000, according to Robert G. Morgan, chief deputy registrar of voters for the county.

Until early 1979, all of Riverside County's election data processing was done in batch on the central county system — an IBM 370/158 and a 3031. Such processing consumed about 3% of the total system resources except at election times.

"Election departments and DP departments are sometimes at odds with one another," Morgan said. "For one thing, elections are too unscheduled for DP departments, compared with the rest of their work.

"With elections, it's quiet for six months and then we want to monopolize the machine for three weeks; it complicates scheduling," he added. "At the same time, you can't postpone an election or rerun it. There's no such thing as not being ready or making serious mistakes."

Old Systems, New Laws

Because of those issues, Morgan eventually began to look into the possibility of acquiring his own system for the county election data processing.

"We had a requirement to upgrade the voter registration and election officer system," Morgan recalled. "The old system didn't do all it should and new laws kept forcing us to do more [information processing] in less time."

The county contracted with DFM Associates, Inc. of Costa Mesa, Calif., to develop a system tailored to the county's needs and to help procure the appropriate hardware.

The result was the Election Information Management System (EIMS), a 15-function software system designed to manage election information from voter registration through polling place management and ballot counting.

As for hardware to run it on, "we needed a minicomputer with a good data base management system [DBMS] and an interactive Cobol programming capability that would meet both ours and the county's requirements, which included handling up to 300,000 registered voters," DFM's Curt Fielder explained.

DFM finally settled on a Data General Corp. Eclipse C/350 with 750K bytes of main memory for the county, along with two 192M-byte disk drives, one dual-density tape drive, a Dasher 100 char./sec printer and a 600 line/min printer, 10 Dasher terminals and the Infos data management system.

The heart of EIMS comprises five major files: voter file, street index file, precinct data file, election officer file and polling place file. Using the information in these files, the system can:

- Identify voters' precincts, election districts and Zip Codes from their addresses.
- Identify each precinct's congressional district, state senatorial and assembly district, school district, water district and so on.
- Generate mailers and lists for elections.
- Print ballot style and quantity requirements for all precincts.
- Provide accountability statistics for affidavits used in voter registration.

Riverside County uses EIMS to generate the differing ballot styles required for each election, Morgan explained. In California's June 3 primary, because of the variety of parties, districts and elections involved, a total of 258 different ballot styles were used



within the county.

In addition, EIMS can automatically issue and keep track of absentee ballots, send candidate-supplied information to the proper voters and keep track of the polling places and election officers for election day.

Since the installation of the hardware in January 1979, the software functions have been implemented gradually, with the last function — election ballot counting — currently being readied for the presidential election Nov. 4.

For the primary, all capabilities except election ballot counting were on the system, while election ballot counting remained on the IBM equipment, Morgan explained. In November, however, all functions will be on the DG equipment and the IBM computers will serve as backup.

With "nothing we don't like" about the system, according to Morgan, Riverside County is well on its way to DP independence. "From a managerial standpoint, EIMS is probably the most valuable tool I have," he observed.

Free EDP-Audit Seminars.

Learn how to audit any computer- no programming experience required.

You've seen the recruitment ads for auditors. The skill requirements look more and more like data processing and less and less like auditing. "COBOL and familiarity with XYZ computer system required."

That's why Cullinane Corporation has designed a complete family of EDP-audit software systems that let the auditor concentrate on *auditing* – without relying on complicated computer programming languages or DP staff assistance.

Cullinane offers three packages, EDP-AUDITOR, EDP-AUDITOR/3 and CARS.

One of them is right for you no matter how complicated or unique your auditing requirements. Even the difficult jobs like statistical sampling and summary analyses can be accomplished quickly, accurately and in simple English.

Cullinane audit software comes with a comprehensive and easy-to-use Library of Audit Routines that allows you to extract the specific data you need from virtually any computer system, to perform calculations and produce reports, confirmation documents and/or charts in any format you choose.

Like our software, our free EDP-audit seminars are designed *for* auditors *by* auditors. Sign up for the seminar nearest you. No programming experience required.

Cullinane Corporation

Dates and Cities

Oct.
7 Allentown, PA
7 Columbia, SC
7 Portland, OR
7 Vancouver, BC
8 Des Moines, IA
8 Halifax, NS
8 Topeka, KS
9 Darien, CT
9 Orlando, FL
9 Minneapolis, MN
14 Charleston, WV
14 Piscataway, NJ
14 Regina, SASK
14 Riverside, CA
14 Sacramento, CA
15 Houston, TX
16 Cincinnati, OH
16 Providence, RI
16 White Plains, NY
28 Baltimore, MD
28 Columbus, OH
28 Green Bay, WI
28 Syracuse, NY
28 Tucson, AZ
29 Dearborn, MI
29 Montreal, QUE

Nov.
5 Albany, NY
5 New Orleans, LA
6 Ft. Wayne, IN
6 Los Angeles, CA
6 Salt Lake City, UT
6 Tulsa, OK
6 Westbury, NY
12 Austin, TX
12 Seattle, WA
13 Dubuque, IO
13 Las Vegas, NV
13 Saddlebrook, NJ
13 Tampa, FL
13 Winnipeg, MAN
18 Pittsburgh, PA
18 San Jose, CA
19 Akron, OH
19 Indianapolis, IN
19 Morristown, NJ
19 San Antonio, TX
19 San Juan, PR
20 Albuquerque, NM
20 Washington, DC
25 Toronto, ONT

Dec.
2 Calgary, ABT
2 Grand Rapids, MI
2 Memphis, TN
2 Norfolk, VA
3 Amarillo, TX
4 Newport Beach, CA
9 Birmingham, AL
9 Buffalo, NY
9 Chicago, IL
9 Cleveland, OH
9 Harrisburg, PA
9 Reno, NV
9 San Francisco, CA
10 El Paso, TX
10 Montreal, QUE
11 Louisville, KY
11 New York, NY
16 Boston, MA
16 Detroit, MI

I want to attend your EDP-AUDIT seminar in _____ (City)
on _____ (Date)
My computer is _____
Name/Title _____
Organization _____
Address _____
City _____ State _____ Zip _____
Phone _____
Mail to: Rosalie Cope
Cullinane Corporation
20 William Street
Wellesley, Mass. 02181
Phone (617) 237-6600

CW Oct. 6, 1980

Audit Software: Cullinane

Spotlight on the Human Side

Info 80 Preview

By Ann Dooley
CW Staff

NEW YORK — The human side of DP will rate special attention at Info 80, which opens today at the New York Coliseum.

"Productivity Improvement in the DP Organization — A Systems Problem," Session 5.1 on Monday from 11:00 a.m. to noon, will focus on systematic methods for setting productivity objectives as well as the structure of a management control system to define goals and measure white-collar productivity.

John Konvalinka, partner in Administrative Services for Arthur Anderson & Co., will chair the session. Alonzo Grace Jr., president of A.G. Grace and Co., will speak on how to apply structured practices to local problems.

Monday afternoon's Session 5.2 from 1:30 to 4:30 p.m. will focus on the "People Side of EDP — A Major Consideration for Productivity Improvement in the DP Organization." The session will focus on the psychology of personnel productivity and consider the "psychological profile" of the DP person in evaluating the factors that control his motivation and drive.

Chairman John Konvalinka and Dr. Norman Gekoski, president of Management Scientists, Inc., will also speak on how the organization views the DP personality and the career paths that suit the individual's self image and the organization's expectations.

Productivity Session

Chairman Hugh Ryan, manager of Administrative Services for Arthur Anderson & Co., and speakers Winslow Hill, manager of Home Office Information Services, Bethleham Steel Corp., and Robert Miller, chief systems engineer for the Chicago Police Department, will present Session 5.4 on "Increasing Productivity in the System Development Process" from 9:00 a.m. to noon on Tuesday, Oct.7. This session will examine various approaches to productivity improvement and how the methodologies affect design changes and other conditions in system development.

On Tuesday from 1:30 to 4:30 p.m., Session 5.6 will deal with "Trends in User-Oriented Command Languages to Improve Programmer Productivity."

Programming trends will be discussed by chairman Thomas Harris, chairman of the Codasyl Committee on Command Languages, Digital Equipment Corp., and speakers Gary Nelson, senior consultant at Control Data Corp.; John McKeehan, language support manager, IBM; and William LaPlant Jr., director of DOD Computer Standards Program, U.S. Air Force.

System Design

"Human Factors in Interactive System Design," Session 5.7, will be held from 9:00 a.m. to noon on Wednesday and will include chairman Melvyn Bergstein, partner-in-charge of the Technical Services Organization, Arthur Anderson & Co., and speakers William Kiedaisch, director of Information Systems, General Foods, Corp., and W. Grant Annable, managing director of Information Systems and Services, American Can Co.

The panel will examine the approaches to effective interactive system design and discuss first-hand implementations in context with human factor considerations.

Registration is at the door and costs $295 for the four-day conference.

The sponsors Clapp & Pokiak, Inc. are located at 245 Park Ave., New York, N.Y. 10167.

PROGRAM AT A GLANCE

	INFORMATION MANAGEMENT			OFFICE AUTOMATION		
MONDAY AM	Keynote: Session 1.1 Enterprise Systems—A Concept for the 80's Session 1.2 page 13 Information Resource Management—A Prerequisite for an Effective Information System			Keynote: Session 1.1 Enterprise Session 2.1 page 15 Office Automation for the 1980's—Realistic Objectives Whose Times Have Come		
MONDAY PM	PLANNING Session 1.3 page 13 Long Range Planning for the Information Resource—An Essential Component of Information Systems Planning			PLANNING Session 2.2 page 15 Current Experience in Office Automation		ADVANCES IN OFFICE AUTOMATION TECHNOLOGY Session 3.1 page 17 Computer Branch Exchanges in the Office of the Future
TUESDAY AM	Session 2.4 page 16 Planning for the Automated Office—System Considerations	FINANCIAL SYSTEMS Session 8.1 page 27 Financial Reporting in the 1980's—A Ledgerless World Session 8.2 page 27 Financial Reporting and Control Concepts in a Multi-National Corporation	MARKETING SYSTEMS Session 9.1 page 28 Marketing Information Systems for Marketing Management	Session 2.4 page 16 Planning for the Automated Office—System Considerations	COMPUTER CONFERENCING Session 2.3 page 15 Computer-Based Conferencing—A Systems Approach to the "Office-less Office"	Session 3.2 page 17 Optical Scanning—Its Role in Office Automation
TUESDAY PM	Session 1.5 page 13 Information Systems Planning for the "1980" Corporate Environment	Session 8.3 page 27 Decision Support Systems for Budgeting in Financial Analysis	Session 9.2 page 28 Decision Support Systems for Marketing Management		WORK STATIONS Session 2.5 page 16 The Manager's Use of the "Management Work Station"	Session 3.3 page 17 Microfilm Systems in the Office of the Future
WEDNESDAY AM	DECISION SUPPORT SYSTEMS Session 1.6 page 14 Computer-Assisted Decision Tools for Planning, Analysis, and Decision-Making	Session 8.4 page 28 Information Systems for Cash Management	Session 9.3 page 28 Systems for Marketing and Sales Analysis	Session 2.6 page 16 Planning for the Automated Office—Organizational Considerations		Session 3.4 page 18 Report on 1980 Word Processing Systems Session 3.5 Security Techniques in Office Automation
WEDNESDAY PM	Session 1.7 page 14 Decision Support Systems for Tactical and Strategic Planning			Session 2.7 page 16 Planning for the Automated Office—The Vendor's View		Session 3.6 page 18 Intelligent Copiers—A New Approach to Document Distribution
THURSDAY AM	INTEGRATION Session 1.8 page 14 Planning and Management Considerations for the Distributed Information Resource	LAW OFFICE AUTOMATION Session 17.1 page 35 Law Office Automation —A Fully Integrated Approach		INTEGRATION Session 1.8 page 14 Planning and Management Considerations for the Distributed Information Resource	HUMAN RESOURCES AND OFFICE AUTOMATION Session 2.11 page 17 The Impact of Office Automation on the Human Resource	
THURSDAY PM	Session 1.9 page 14 Integration of Office Systems with Data Processing	Session 17.2 page 35 Alternative Approaches to Law Office Automation, and the Applications		Session 1.9 page 14 Integration of Office Systems with Data Processing		

Industry Pundits and Seers Look Ahead to '80s

By Ann Dooley
CW Staff

NEW YORK — The Information Resource Management Exposition & Conference (Info 80), which opens today at the New York Coliseum, will spotlight advances in DP technology for the '80s.

Among the sessions will be "Information Systems Technology for the '80s and Its Impact on the User," which will detail the probable effects that rapid hardware, software and personnel changes are making in the relative costs of powerful information processing systems for their users.

Examples given by chairman John Kirkley, editor of *Datamation*, and speaker Dr. John McCredie, president of Educom, Inc., based on trends of currently available systems will illustrate some of the likely impacts. Session 6.1 will be given Monday 11:00 a.m. to noon.

John Gantz, director of publications for International Data Corp., and his panel of industry experts will examine "Distributed Data Processing — Current Experience and Plans for the 1980s" at Session 6.2 on Monday 1:30 to 4:30 p.m.

The concept of distributed data processing (DDP) is evolving and will eventually spread to every area of an organization. But the development of a successful DDP environment requires sophisticated planning, well-designed products and competent system development strategy.

This session will focus on user experience with DDP — what the users have accomplished, with what results and what are their plans for the future.

Closer Look

"Distributed Data Processing — Implementing Strategies and Organizational Implications" will take a closer look at the involvement of the user in the definition of requirements, the sophistication of the particular system and the independence of the user in applications development; all of which can heavily affect the long-term results.

Dr. James Emery, professor of decision sciences at the Wharton School, and a panel will consider the requirements, organizational behavior, ease of applications development, staff turnover, training, career planning and other criteria for the various distributed architectures and the alternative implementation strategies in relation to their impact on the viability of the operation. The session will be held Tuesday from 9:00 a.m. to noon.

Info 80 Preview

"User Perspectives for Data Communications in the 1980s" will be the subject of Session 6.4A Tuesday from 1:30 to 4:30 p.m. This session, chaired by John Donovan, director of corporate data processing, Aetna Life & Casualty Co., will focus on the implications for business strategy and information systems planning of integrated data, voice and image transmission networks. Also discussed will be how users can make best use of these networks, what are the applications and the panel's own personal experiences in setting up such systems.

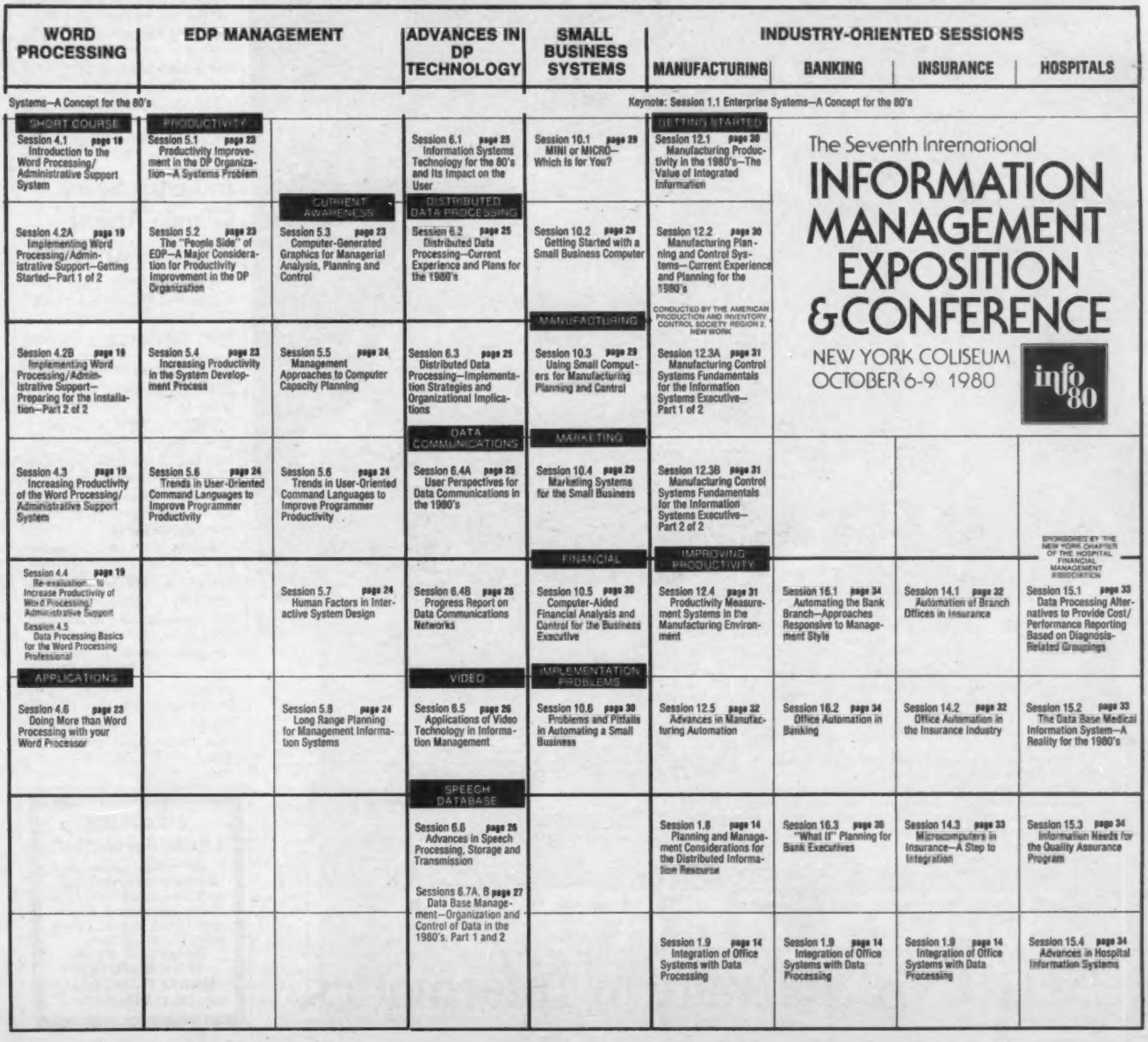
An overview of salient developments in data communications and the impact on user planning will be presented by session chairman Kenneth Bosomworth, president of International Resource Development, Inc., Wednesday from 9:00 a.m. to noon.

Session 6.4B, "Progress Report on Data Communications Networks," will also include a brief look at trends and developments in common and value-added carriers, equipment and considerations in integrating equipment and services into a total communications network.

Also examined will be the architecture of future business communications networks and high-speed multimedia information distribution systems for the office of the future.

A two-part session entitled "Data Base Management — Organization and

(Continued on Page 14)



Info 80 to Focus on Management Information

NEW YORK — Three sessions focusing on management information as a corporate resource will highlight the seventh international Information Resource Management Exposition & Conference (Info 80), at the New York Coliseum here this week.

Each of the three sessions was designed to fit in with Info's "conference-within-a-conference" format and will be supplemented by six other management information sessions during the four-day meeting.

Info 80 Preview

The first session, slated to take place on the opening day of the conference, will be headed by Harold Uhrbach, president of DBD Systems, Inc., and will tackle the subject of what is involved in an information management system.

"Information Resource Management: A Prerequisite for an Effective Information System" will detail how such a system is dependent on the development and coordination of data bases, conventional files, data communications and automated office and administrative facilities.

The second session, "Long-Range Planning for the Information Resource: An Essential Component of Information Systems Planning" will deal with the hardware and architectural framework that supports each organization's information system.

Directed by Joseph Judenberg, vice-president of Chase Manhattan Bank, the session will cover that planning necessary to implement an information systems in conjunction with regular business strategies.

System Integration

The third session will be aimed at the "Integration of Office Systems with Data Processing."

Chaired by John J. Walsh, director of communications services and facilities at Avon Products, Inc.; William R. Synott, senior vice-president of the First National Bank of Boston; and R. Dennis Wayson, director of corporate information systems at Sun Co., Inc., this session will address the feasibility and practicality of management structures.

Info registration fees are $295 for the four-day conference plus admission to the show floor, $110 for one-day at the conference and show and $60 for a half-day. The cost for just attending the exhibitor's show is $10, or $5 with advance registration.

The conference is sponsored by Clapp & Poliak, Inc., 245 Park Ave., New York, N.Y. 10017.

Industry Seers Glance Ahead To '80s Advances

(Continued from Page 13)

Control of Data in the 1980s" will be presented Thursday from 9:00 a.m. to noon and from 1:30 to 4:30 p.m. and will be chaired by Harold Uhrbach, president of DBD Systems, Inc.

Session 6.7A will focus on data base concepts — the nature and characteristics of data base operations and supporting data base management systems and system architecture for the 1980s.

Session 6.7B will examine how to design effective data bases and look at why some data base implementations fail and how to counteract such failures.

Registration is at the door only and costs $295 for the four-day conference. The show's sponsors are Clapp & Poliak, Inc., located at 245 Park Ave., New York, N.Y. 10167.



Our users save over $1,000,000 a month.

The SHRINK/2 file compression systems reduce the volume of data on disks and tapes by as much as 80% for users of OS 360/370 and compatible systems.

A software solution to a hardware problem. File sizes can be enlarged without adding more spindles.

Existing spindles are freed up for new applications.

That can mean enormous savings in capital outlays for hardware.

Not to mention the savings on enlarged computer rooms, cooling requirements and other related costs.

And compressed files are made secure through encryption at no extra cost.

We also offer another version, SHRINK/IMS, designed for IMS/VS data bases. It's totally transparent to IMS application programs; the programmer never even knows it's there. And its compression is selective for maximum performance.

Why not help yourself to more file capacity from your present hardware and to big savings. Call, send the reply form below, write on your letterhead, or just attach your business card to the coupon.

21050 Vanowen Street, Canoga Park, California 91304
Tim Corey, Product Manager (213) 887-9121
Telex 69-8715 Cable INFORMATIC

informatics inc

8-CW-10680

☐ Send me information about SHRINK/2
☐ Send me information about SHRINK/IMS
☐ Send me a salesman with an order form

Name_____ Title_____
Company_____ Tel. ( ) _____ Ext. _____
Address_____
City_____ State_____ Zip_____
CPU_____ Op. System_____ Disk: Model_____ Quan. _____

SHRINK® Software by Informatics.

The Information Management Company.

$12,000,000
LEASE FINANCING

I will provide custom TAX-LEVERAGED leases ($500,000+ each) on your IBM 303X, 4300, Peripheral packages, or AMDAHL system before 12/31/80. Call me now to discuss your needs.

Joseph Batch, V.P. at:
IPS COMPUTER MARKETING CORP.
(201) 262-9500

Awaiting Bids on Ecom

USPS Begins Two-Way Intelpost With Canada

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Two-way Intelpost service, the first in a series of projected U.S. Postal Service (USPS) electronic mail offerings, has begun operation.

Meanwhile, the agency issued an invitation for bids on Electronic Computer-Originated Mail (Ecom), another of its new on-line services. The contract, basically, involves design and installation of a communications network, and supporting terminal hardware and software, to interconnect 25 U.S. cities.

For $5 per page, the new Intelpost facsimile network transmits messages between New York or Washington and Toronto. Normally, messages are delivered the following day, but same-day delivery is available in some cases: a message can be picked up at the receiving post office, or the user can obtain special delivery service for an additional charge — $2.00 per message in the U.S., $2.50 in Canada.

Postal Service headquarters here and the World Trade Center in New York are the U.S. terminals of the new network. They are open 8 a.m. to 5 p.m. Monday through Friday.

Intelpost messages can be transmitted to any point in Canada. At the moment, Toronto receives all of the traffic, but a USPS spokesman said the Canadians are planning to add additional terminal cities shortly.

Besides text, Intelpost handles statistical cables, "creative artwork" and correspondence written in a language other than English. Banks, government agencies and multibranch, multinational industrial organizations are expected to be the prime users.

Dispute With FCC

Although proposed several months ago, Intelpost had been hung up in a dispute between USPS and the Federal Communications Commission (FCC). The commission refused to let U.S. international record carriers (IRC) lease the circuits needed to transmit Intelpost messages overseas.

The reason, basically, is that USPS would be reselling this capacity to its Intelpost customers and the FCC said this resale privilege must be extended to all other international data communications users if it is granted to the Postal Service. The IRCs, worried that unrestricted resale will shrink their revenues, will not accept the commission's terms.

The Postal Service has gotten around the FCC by going to Canada via domestic circuits extending from New York and Washington to the U.S. border (largely unrestricted resale of domestic U.S. communication circuits began some time ago).

Although the present Intelpost offering provides service only between the U.S. and its northern neighbor, European extension is on the way, with or without the FCC's blessing. In the latter case, overseas messages will be transmitted to Canada and relayed across the Atlantic from there.

Ecom has also been embroiled in controversy.

Basically, this service was designed for mass mailers. It will permit them to send messages on-line from their premises to serving post offices (SPO) in 25 cities. There the bits will be converted to hard copy, and each message will be delivered by postal carrier — typically within two days after being dispatched by the sender. Initially, USPS plans to charge 30 cents for a one-page Ecom message and 40 cents for a two-pager.

Commercial vendors of electronic mail and message services, fearing government competition, want Postal Service participation in Ecom restricted to hard-copy conversion at the SPO and delivery from that point. USPS, however, insists on offering a competing end-to-end service that would include transmission.

Although the initial Ecom offering will rely primarily on commercial vendors for transmission, the Postal Service apparently is planning to serve two groups of end users directly — those who bring magnetic tapes to their local post offices for input to the network at that point, and those who operate private communications networks. Both types of access are among the "optional requirements" in the recently issued Ecom bid invitation.

'Besides text, Intelpost handles statistical cables, "creative artwork" and correspondence written in a language other than English.'

At a seminar on electronic mail earlier this month, Postmaster General William F. Bolger said his agency had received an inquiry from an unidentified company interested in transmitting Ecom-type messages, via its own private network, to SPOs. If this service is implemented, Bolger added, it will be offered to others.

He also indicated that such a limited offering would begin before January 1982, the projected startup date for the public Ecom service.

COMPARE SMARTS.

INTEGRAL MODEM NOW AVAILABLE.*



Model 920C shown.

Feature-for-feature our smart CRT terminals cost less than *their* dumb ones. Much less. Compare smarts. Then compare price. You'll pick TeleVideo.

Four different models to choose from. Each with features you'd expect to pay extra for. But with TeleVideo, they're standard.

We put a lot of engineering savvy into our CRTs. Their modular design means high reliability. It also lets us build in high volume. And sell to you at low prices.

Find out how you can make your next CRT buy a smart one. Contact TeleVideo today for information.

Nationwide Field Service is available from General Electric Co., Instrumentation and Communication Equipment Service shops.

TeleVideo

TeleVideo, Inc., 2149 Paragon Dr.
San Jose, California 95131
Phone (408) 946-8500

*Optional, with models 912C and 920C only.

COMPARE PRICE.

CALIFORNIA Costa Mesa (714) 557-6095 • San Jose (408) 946-8500 • ILLINOIS Oak Grove Village (312) 981-1706
MASSACHUSETTS Boston (617) 668-6891 • NEW YORK/NEW JERSEY Paramus (201) 265-1321 • TEXAS Dallas (214) 980-9978

Waiting On Delivery of A DEC LA120?

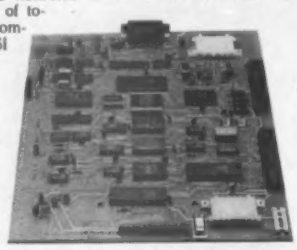


Avoid the hassle by upgrading your LA36 for 1200 baud operation with a DS120 Terminal Controller.

The Datasouth DS120 gives your DECwriter® II the high speed printing and versatile performance features of the DECwriter® III at only a fraction of the cost. The DS120 is a plug compatible replacement for your LA36 logic board which can be installed in minutes. Standard features include:

- 165 cps bidirectional printing
- Horizontal & Vertical Tabs
- Page Length Selection
- 110-4800 baud operation
- 1000 character print buffer
- X-on, X-off protocol
- Self Test
- RS232 interface
- 20 mA Current Loop interface
- Top of Form
- Adjustable Margins
- Double wide characters
- Parity selection
- Optional APL character set

Over 4000 DS120 units are now being used by customers ranging from the Fortune 500 to personal computing enthusiasts. In numerous installations, entire networks of terminals have been upgraded to take advantage of today's higher speed data communications services. LSI microprocessor electronics and strict quality control ensure dependable performance for years to come. When service is required, we will respond promptly and effectively. Best of all, we can deliver immediately through our nationwide network of distributors. Just give us a call for all the details.



DATASOUTH COMPUTER CORPORATION

4740 Dwight Evans Road • Charlotte, North Carolina 28210 • 704/523-4800

why would a busy DATA PROCESSING professional GO TO GRADUATE SCHOOL ON SATURDAY?

To be better prepared for the challenges that come on Monday.

Fairleigh Dickinson University announces a weekend program leading to an MBA in Management (For Data Processing Professionals). On the weekend, when the business world slows down, an innovative graduate business administration program revs up at Fairleigh Dickinson University in Rutherford, New Jersey. The program, open exclusively to experienced and academically qualified data processing professionals, leads to an MBA degree in two years of study on Saturdays.

Data processing professionals with at least five years' experience in the field, take courses in five-week modules. They progress through the program in a single group, beginning in September or February, completing three modular courses each semester.

For an application and more information, mail the coupon today. Or phone the College of Business Administration, Rutherford Campus, at (201) 933-5000, Ext. 210.

University Admissions
Fairleigh Dickinson University
135 Montross Avenue
Rutherford, NJ 07070

Please send me an application and more information about the MBA in Management (For Data Processing Professionals).

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

BUSINESS PHONE _____ area code

HOME PHONE _____

CW 10-6

No person acting within the scope of his or her authority and responsibility at Fairleigh Dickinson University shall discriminate on the basis of race; color; creed; sex; national origin; handicap; military status; or age, except to the extent permitted by law.

fairleigh dickinson UNIVERSITY

Florham-Madison, Rutherford/Wayne, Teaneck-Hackensack, New Jersey

Unregulated Bell Arm Expected in a Year

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — A new communications common carrier, capitalized at several billion dollars, will begin commercial operation within the next year or two, a former Federal Communications Commission (FCC) official said here last week. It will be able to provide many new and innovative services and products to data communications users, but it will also pose a number of problems for both regulators and competitors. The resulting arguments could delay introduction of the services.

The speaker — Philip Permut, former chief of the FCC's common carrier bureau and now a private attorney — was referring to the unregulated Bell System subsidiary mandated by legislation now pending in Congress and by the commission's decision in the Second Computer Inquiry.

Although both the commission and Congress have devoted much attention to the structure of this new entity, as Permut explained in a speech to the 1980 Electronics and Aerospace Systems Conference (Eascon), a key question remains to be resolved — how to establish the Bell Unregulated Subsidiary (BUS) so that its opportunity to innovate is maximized while its ability to engage in anticompetitive practices is minimized.

He expects this issue to dominate the communications debate in Congress and at the FCC during the coming year and possibly beyond.

USPS Speaker

Another Eascon speaker, Postmaster General William F. Bolger, said the U.S. Postal Service (USPS) expects to complete negotiations with Canada "within the next few weeks" to expand its intelpost facsimile service to Europe.

The service began last month between the U.S. and Canada. (See story on Page 15.) The overseas operation has been delayed by the FCC's refusal to let USPS resell to its Intelpost customers circuits leased from the U.S. international record carriers (IRC).

If this refusal continues, Bolger said, USPS will route Intelpost overseas messages to Canada and have them relayed across the Atlantic from there. He added, however, that the agency has asked one unidentified IRC to go back to the FCC and ask again for permission to lease international circuits to USPS, which could then be resold to Intelpost customers.

Bolger indicated that the commission's computer inquiry decision, which deregulates enhanced communication services — Intelpost is one example of such a service — suggests that the FCC may now be more amenable to the RGSMF idea than it was several months ago when the initial IRC applications were rejected.

Additional Details

Bolger also provided some additional details concerning Postal Service plans to provide Intelpost, along with another new offering, Electronic Computer-Originated Mail (Ecom), through a separate subsidiary.

This new subsidiary, he said, will be capitalized with funds borrowed from the U.S. Treasury, enabling it to obtain money at less than the prevailing commercial rates. He also said that the start-up capitalization will be "at least $25 million."

Bolger reiterated Postal Service intentions not to compete with commercial providers of electronic mail and message services. Specifically, he said:

- Revenues earned from conventional mail operations will not finance the new electronic mail services. (This is the main reason for establishing the new subsidiary.)
- USPS will not solicit congressional subsidies to support its electronic mail offerings.
- "We will avoid providing point-to-point — sender directly to recipient (Generation 3) — electronic message transmission services." Instead, the agency will rely on its letter carriers to provide the final link in the electronic network and use on-line transmission only to connect the message sender with the post office in the city to which his message is addressed.

However, despite these assurances and several others in Bolger's Eascon remarks, all of which have been stated a number of times in the past few months, commercial vendors of electronic mail and message services are not likely to slacken their opposition to Ecom.

The Postal Service's plan to borrow startup money from the Treasury is likely to be one source of conflict. Another is the agency's intention to contract with commercial firms that wish to supply Ecom service. From what Bolger said at Eascon, it appears the postal service will develop the service terms and conditions, as well as specifications for interfacing commercial communication networks to post office terminal equipment, and then impose them on its prospective commercial "partners." They have made it clear that such a subordinate role is unacceptable.

Another Eascon speaker — Dr. William J. Perry, undersecretary of defense for research and engineering — said recent complaints about the expense, complexity, maintenance and operational difficulty of military electronic systems is misplaced.

While these shortcomings exist, he said, the critics are wrong to demand simpler, cheaper systems.

What is needed, according to Perry, is more electronics — not less. Many of the missiles, aircraft, early-warning radar systems and similar weaponry in the U.S. arsenal is based on technology developed many years ago. It also relies too much on mechanical and electromechanical components that, with today's technology, could be replaced with integrated circuits.

Developments in consumer electronics during the past decade prove that the way to build more reliable more cost-effective and more operable systems is to use more electronics rather than less, he contended. Pocket calculators, for example, are generally recognized as being far superior, on all of these counts, for many applications which formerly were performed exclusively by electromechanical calculators.

COMPUTERWORLD

. . . the one weekly newspaper that's designed to fulfill your unique "need to know" . . . the one newspaper that can give you all the current information you need to benefit you, your organization and your career progress . . . 52 weeks of incisive news, commentary and special reports . . . subscribe today, use the attached postage paid order form.

☐ Please enter my subscription
(details on back)

☐ I'm already a subscriber, but I'd like you to change my:
☐ address
☐ title
☐ industry
☐ other

My current mailing label is attached and I've filled in new information on the other side.

Put old label or label information here

Please send me COMPUTERWORLD for one year. RATES: United States—$30 Canada, Central & South America—$50
Europe and Near East—$90 Other Foreign—$150 (Airmail Service)

☐ Check Enclosed
☐ Am Ex ☐ BA/Visa ☐ MC (MC Only - List four digits above your name)

If charge we must have cardholder's signature: _____ Expiration Date: _____

First Initial	Middle Initial	Surname	
Your Title			
Company Name			
Mail To:			
City		State	Zip Code

Address shown is:
☐ Business
☐ Home

☐ Check here if you do not wish to receive promotional mail from *Computerworld*.

PLEASE CIRCLE 1 NUMBER IN EACH CATEGORY

BUSINESS/INDUSTRY
10 Manufacturer of Computer or DP Hardware/Peripherals
20 Manufacturer (other)
30 DP Service Bureau/Software/Planning/Consulting
40 Public Utility/Communication Systems/Transportation
50 Wholesale/Retail Trade
60 Finance/Insurance/Real Estate
70 Mining/Construction/Petroleum/Refining
75 Business Service (except DP)
80 Education/Medicine/Law
85 Government - Federal/State/Local
90 Printing/Publishing/Other Communication Service
95 Other: _____

TITLE/OCCUPATION/FUNCTION
11 President/Owner/Partner/General Manager
12 VP/Assistant VP
13 Treasurer/Controller/Finance Officer
21 Director/Manager of Operation/Planning/Administrative Service
22 Director/Manager/Supervisor DP
23 Systems Manager/Systems Analyst
31 Manager/Supervisor Programming
32 Programmer/Methods Analyst
41 Application Engineer
42 Other Engineering
51 Mfg Sales Representative
52 Other Sales/Marketing
60 Consultant
70 Lawyer/Accountant
80 Librarian/Educator/Student
90 Other: _____

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

CIRCULATION DEPT. 375 Cochituate Road, Rte. 30, Framingham, MA 01701

Detach here, fold, and place in post-paid envelope attached through binding.

Salaries Volatile in '79, AMA Survey Reports

By Bruce Hoard
CW Staff

NEW YORK — Although in most cases DP salaries rose predictably from 1978 to 1979, a comparison of median salaries for the two years made by the American Management Associations (AMA) reveals some surprising and precipitous changes.

In the AMA's study, entitled "Supervisory Management Report," three job areas in five regions of the U.S. and Canada were investigated.

The job areas were applications programming, systems software and operations. The regional areas include the Northeast, Southeast, North Central, South Central, West Coast, Canada and the U.S. as a whole. Three levels of authority within each job area were examined.

Most Volatile

The systems software area was the most volatile over the two-year period, with two sharp salary increases and two seemingly inexplicable drops.

On the up side, the Northeast reflected an encouraging $6,300 increase for top, or Level III, supervisory personnel, from $25,200 in 1978 to $31,500 last year. The West Coast experienced a similar increase, with Level III salaries moving up in the form of a $6,900 leap from $25,000 to $31,900.

The down news came in the North Central area, where Level I people suffered a $2,600 drop from $23,000 to $20,400. Nationwide Level I salaries were also down, this time $2,200, from $22,600 to $20,400.

However, results in this category should be considered inconclusive because the nation as a whole and the North Central were the only areas in which Level I salaries were reported.

Upward Curves

Applications programming and operations both followed a more predictably upward curve, with a couple of exceptions.

The biggest gainers in applications programming were Level III supervisors in the North Central. Their salaries escalated $4,600, from $24,600 to $29,200. More modest increases ranging from $3,000 to $4,000 were posted in the Southeast, Canada and the overall U.S.

There were few significant year-to-year shifts in operations salaries, which showed steady, upward movement. One area of relative stagnation was Level I in the Southeast, where the rise was a meager $600, from $13,300 to $13,900.

Canadian salaries were measured in Canadian dollars, which means the comparatively lean earnings there are even less impressive than at first glance. In two of the four areas where figures were available, salaries dropped.

No Set Sample

The most likely explanation for reduced salaries is the variation of the survey participants from one year to the next, according to Martin Harper of the AMA.

"The problem is, we're not locked into a set sample," he said. "When you get down to a finite level, you have to look at it with some considerable questions as to its absolute validity and you're going to have some leeway."

Despite the fact that hundreds of companies were interviewed in the course of the survey, many of them were not DP firms, and in the case of some locations and some jobs, there may have been a very small response, Harper said.

Under such circumstances, one salary could have a disproportinately large impact on the overall results, he added.

"So what we usually try to do in looking at a set for a location or region is go after what we call the key of benchmark jobs and base our analysis on them," he said. "Key" or "benchmark" jobs are those most commonly found in similar organizations.



Carnegie Press Offers Training

MADISON, N.J. — Carnegie Press, Inc. is now offering two- and three-day on-site seminars in four main areas: data communications, data procesing, documentation and microprocessing. The programs are being produced in cooperation with the American Institute for Professional Education.

Carnegie Press reportedly presents custom-designed curricula to meet particular organizational needs. The courses are given on a prorated basis contingent on the length and scope of the course and the number of employees the company enrolls.

Most of the Carnegie courses include a six-month follow-up. Additional information is available from Carnegie Press, 100 Kings Road, Madison, N.J. 07940.

Xerox Schedules Seminar Series

LOS ANGELES — Xerox Computer Services has scheduled a 14-city series of seminars on how computer-based management systems can improve productivity for managers.

Production control, master production scheduling, material requirements planning, cost planning and control and planned inventory management are among the subjects that guest speakers will discuss.

The seminars will occur through Oct. 22 and vary in price. Further information is available from John May, Xerox Computer Services, 5310 Beethoven St., Los Angeles, Calif. 90066.

altergo

There's a new name in the software products market.
It is called Insac Software Inc.

Earlier this year, Altergo Software was acquired by the INSAC Group and to reflect that change we have become INSAC Software. In the three years since we began selling systems software products, we have met our initial objectives. We operate seven fully-staffed regional sales and service offices and have installed products at more than 400 computer sites in the U.S. and Canada. We sell a range of systems software products with two of them, SHADOW II and SYSTEM/MANAGER, elected to the Datapro Software Honor Roll in each year since their market introduction.

As INSAC Software, we are now in the position to offer users a number of advantages:

- Larger financial resources that will permit expansion in terms of additional sales and service offices as well as their assigned personnel.
- The capability to increase the number of different systems software products that we sell and maintain.
- An ability to offer flexible sales terms. Along with the customary purchase plans, we provide monthly and other lease and rental arrangements.
- The management support of our parent company.

INSAC

Insac Software Inc.

For more information on **Insac** and **Insac Software** send us this coupon.

INSAC

Insac Software Inc 2300 Peachford Road Atlanta Georgia 30338

Please send me a copy of
☐ **Insac** brochure ☐ **Insac Software** product literature

name title

company

address

city state zip

'Poor or Nonexistent Management'

GSA Head Pans State of Federal Computing

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The federal government has taken the tool offering "the highest hope for efficiency" — the computer — and managed it in the most inefficient way, General Services Administrator Rowland G. Freeman III, said last week.

Delivering the keynote address to the Federal Computer Conference here Monday, Freeman said "accountability in ADP is as poor as anything in the government. The level of our ADP efficiency is even lower."

Coming from the head of the General Services Administration (GSA) — an agency with broad DP oversight responsibilities — Freeman's remarks on the state of federal computing were particularly pessimistic. When he became GSA administrator last year, he said, "lack of accountability was one of many symptoms of years of poor or nonexistent management" at the agency.

Noting the conference theme of "applying computers to make government more efficient and accountable," Freeman said "accountability and efficiency form the bedrock for managing the government in the '80s.

Hallmark of Decade

"Increased use of computers to achieve that accountability and efficiency must become the hallmark of this decade," he said. Unfortunately, according to Freeman, "most of you know enough about the state-of-the-art in government to realize we have a long way to go before we can maximize the computer's influence on accountability and efficiency in government."

Expanding on the need for accountability, Freeman said the concept is "a special management style that includes establishing goals, objectives and standards and measuring performance. It's a high ideal that must be shared by every employee," he said, adding it is a goal that can be reached. "I think we can correct some of our sins of the past," he said.

Because GSA oversees federal DP and telecommunications procurements, Freeman related accountability to acquisitions by remarking that "if you know who to reward and who to fire at the end of an acquisition you have a good system."

The government's acquisition process "is far from that," however. According to Freeman, "by the time an ADP acquisition goes through the oversight process of GSA, GAO [General Accounting Office], OMB [Office of Management and Budget] and congressional committees, who do you blame if something is wrong?

"Chances are excellent," he continued, "that by the time the process is completed, the project manager and all the other players have changed. It's clearly a case of too many cooks spoiling the broth."

These acquisition difficulties "have contributed directly to technological obsolescence in government ADP," according to Freeman, who noted half the federal computers are over seven years old. "That alone," he said, "contributes to inefficiency.

"What's worse is the second order of fact. Old machines fail to attract the best computer scientists. That leads to poorly designed software."

Horror Stories

Compounding his gloomy assessment of federal DP, Freeman went through a list of "horror stories" of mismanaged federal information resources. Recognizing the problems is not necessarily knowing how to solve them, however. Some problems, according to Freeman, are rooted in the peculiarities of government management.

Because the government spends public money, it "must be visible and stand public scrutiny and audit" and has consequently developed "extensive regulations and the complex oversight roles," Freeman explained.

"These complexities have caused mission program and agency managers to leave critical, strategic decisions related to ADP to information technicians. The information technicians often have deferred to contracting officers in order to negotiate the narrow pathway to successful acquisitions."

Beyond that, he said, "in government there is a lack of knowledge and experience in ADP planning and acquisition," leading to unnecessary time and resources being spent on acquisitions. The resulting uncertainty over procurement authority leads to "adversary relationships among the acquisition project managers, oversight groups and vendors." The "net effect," according to Freeman, is that "we spend more of our effort on the loops than we do on getting to the target."

Proposed Steps

So, what can be done about all these problems besetting government procurement and use of DP technology? Freeman asked. A few steps have already been taken, he said, noting that most DP procurement and management regulations have been rewritten "to improve clarity and meaning."

Also, more acquisition responsibility and authority is being given individual agencies in an effort to cut down the complexity and time of the process.

Besides the various steps GSA has taken or can take, Freeman said individual agencies must get involved in managing DP "much better throughout the entire life cycle. This includes day-to-day capacity planning or configuration management" as well as requirements forecasting and long-range planning.

Factory Model

"We should manage ADP like any other production facility," Freeman said. "Too many people believe ADP is so unique that it cannot be managed like a factory.

"Well it can. Systems engineering, industrial engineering concepts, production threshholds, standards of performance can be set. Cost accounting can be implemented and the ADP service function can be managed much more professionally," Freeman claimed.

Although GSA and other federal oversight agencies are working to streamline acquisitions and improve standards of information resource management, the real changes must come from those who operate the systems and manage them on a day-to-day basis, he said.

"It is up to you system professionals," he told his audience, "to concentrate on finding, evaluating and using those tools and techniques that will not only contribute to efficiency in the use of computers, but to efficiency in the design, documentation and production of application software."

"If we work together," Freeman concluded, "we can bring about a revolution . . . the potential use of computers to promote accountability and efficiency in government is limitless."

VAX® & PACS™
... team up to solve your problem of Resource Management and Chargeback.
Signal Technology's Process Accounting and Chargeback System (PACS):
- Satisfies in-house, commercial and government contract audit requirements.
- Reports use of all system resources to help optimize configuration and chargeback rates.
- Reports current charges to users on-line.
- NEW! Software packages and non-standard devices can now be accounted ... plus many other features...

*VAX is a registered trademark of Digital Equipment Corporation
For further information, contact
SIGNAL TECHNOLOGY, INC.
15 WEST DE LA GUERRA • SANTA BARBARA, CA 93101 • (805) 963-1552

Terminals NOW!®
PERKIN-ELMER Fox 1100 Owl 1200 Bantam 550
DIABLO Diablo 1640/50
RACAL-VADIC All Models
DEC LA-34 LA-36 LA-120 VT-100 VT-52
TI TI-745 TI-765 TI-820
3 Month Lease or Immediate Sale
Authorized Distributor
NEW!
LEAR SIEGLER, INC.
ADM-3A ADM-31 ADM-42
Your single source for brand-name terminals.
QWIKTERM
BOSTON (617) 246-1665
P.O. Box 185 Lynnfield, MA 01940
SAN FRANCISCO (415) 461-0923
1100 Larkspur Landing Cir., Larkspur, CA 94939
WASHINGTON, D.C. (703) 522-1210
1555 Wilson Blvd., Arlington, VA 22209

Federal DP Ills Viewed Unlike Private Sector's

By Jake Kirchner
CW Washington Bureau

GAITHERSBURG, Md. — You hear it all the time: If only federal agencies ran their DP operations as large corporations do, all government information problems would be solved.

Well, said Robert V. Head of the Brookings Institution, it isn't that simple.

The idea has some "built-in problems," Head told a recent government symposium on information resource management. "Realistically there is no way some of [the government's] practices and procedures can be changed to be more consonant with private industry," according to the Brookings Federal Executive Fellow.

He did allow that if government could be more like private industry in the use and management of information resources, federal agencies "probably would not have the same degree of obsolescence in computer hardware" — the average age of federal systems is now over seven years, he noted.

And, he told the meeting sponsored by the National Bureau of Standards here and the Office of Personnel Management, agencies could "avoid some of the horrendous conversion problems" now plaguing federal computer acquisitions.

Insurmountable Differences

However, there are several insurmountable differences between federal agencies and private corporations, he said.

One of those differences is size. Head noted that in some agencies, information systems are significantly larger than anything in the private sector. The DP budget of General Motors Corp., one of the largest in the private sector, is about $300 million a year, Head noted, who said that makes GM's DP operation roughly equal to many mid-sized federal agencies.

"We have some intrinsic problems of size" and a related degree of complexity in the government "that simply is not present in the private sector." Head pointed to the vastly complex command, control and communications systems operated by the Defense Department, for which there is no analogue in private industry.

Lack of Autonomy

In addition, federal agencies are never going to have the autonomy that private organizations have in procuring and using information resources, Head said. He ascribed to federal DP oversight agencies a "rogue agency" syndrome: the fear that if agencies are not carefully watched "they will do terrible things, like sole sourcing."

Head noted the move in the federal government to give agencies more autonomy in acquisitions once they have proven themselves worthy of such trust, but said federal DP managers will never have the freedom of their private sector counterparts.

Although there is legislation pending in Congress to streamline federal DP practices and policies, the "Brooks Bill," assuming it gets through Congress, may not be that much help, according to Head.

The bill, now awaiting Senate approval, may "mandate some things that aren't going to work too well," he said. For one, the bill calls for a high-level official in every agency to be solely responsible for his agency's information resource management.

'Realistically, there is no way some of [the government's] practices and procedures can be changed to be more consonant with private industry.'

Agency VP Information

While the concept is "superficially appealing" and similar in several respects to a vice-president for information management position in private industry, it may not work so well in the government, he said.

When a private organization appoints VP of information resources management, it does so voluntarily, presumably with the intention of giving the person appointed some authority and input into upper management decisions, he pointed out.

That may not be the case in the federal bureaucracy, in which if there is such a position established, it will be by Congressional fiat. If an agency head is not interested in the activities of that new official, that position will not have much real authority, Head said.

"It would be fairly easy for an agency simply to finesse" that portion of the Brooks Act, according to Head, simply by not allowing the new information official much input into agency decision making.

In addition, the bill proposes the development of agency long-range plans for information resource requirements. But no one seems to know what should go into that kind of plan, according to Head, who expressed skepticism that the planning process would be all that effective.

But given that federal agencies cannot operate like large corporations and given the numerous problems with federal information management today, then "regardless of the potential difficulties of [the Brooks Act] I think it is only fair to conclude that at this point it is our best hope" for substantive changes to federal information resource management, Head said.

Federal information managers should take a "realistic attitude" toward how effective the legislation will be in helping update their operations, according to Head. He noted there is much that can be done to help in this area beyond legislation.

BE A PART OF THE DATABASE REVOLUTION

Learn the newest concepts in Database design, Database administration, and Data Resource management. Learn it in depth. From Yourdon.

If you analyze your fellow workers, you will find that Yourdon-trained people manage noticeably better.

Join them. Take advantage of the new Database Revolution. Superficial knowledge is no longer enough.

Below is a brief description of the new Yourdon Database curriculum. It goes far beyond the one-sided training of the past. Master it, and move smartly ahead.

Choose from the following intensive courses:

1. Database for Managers. This one-day seminar explains database concepts to management. It discusses planning procedures, requirements analysis, database prototyping, data resource administration, and database administration.

2. Database Modeling and Design Workshop. A five-day seminar that teaches the most advanced forms of database design. It begins with procedures for Requirements Analysis. It presents the most highly developed discipline of Information Modeling in the industry.

3. Database Administrator's Workshop. This five-day seminar defines the task objectives and responsibilities of database administration. It focuses on the disciplines of design, implementation, control, maintenance, and reporting.

4. Database Modeling and Design Lectures. A three-day version of #2 above, in lecture form only.

5. Database Administrator's Lectures. A condensed three-day version of #3 above, in lecture form only.

Your time is valuable, so Yourdon will cram every hour of every course with a barrage of fact and example.

For more information on courses and dates and cities where the courses will be given, telephone Yourdon toll free or mail this coupon:

I want to make the most of the Database Revolution. Please send information on the following courses.

☐ 1. Database for Managers
☐ 2. Database Modeling and Design Workshop
☐ 3. Database Administrator's Workshop
☐ 4. Database Modeling and Design Lectures
☐ 5. Database Administrator's Lectures

Name

Company Title

Address City

State Zip Phone

YOURDON
1133 Ave. of the Americas, New York, NY 10036
Phone (212) 730-2670

Call toll-free 800 223-2452.
In New York or Canada call collect: 212 730-2670.

Courts May Extend Cutoff Date For AT&T's Telpak Termination

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. – Although AT&T has requested permission to terminate its Telpak service Dec. 21 it was far from clear last week that the end is in sight.

Telpak users, who include the U.S. government, have gone to court in an attempt to prevent Telpak's demise. They face an estimated 28% increase in their line charges. According to Aeronautical Radio, Inc. and the Air Transport Association, two of those involved, the increase will amount to "well over $100 million per year."

Meanwhile, AT&T has also gone to court. It wants to overturn the Federal Communications Commission (FCC) policies that led to the termination request, essentially because those policies affect virtually all of its other communication services.

Whether Telpak ends will depend on the outcome of three pending court cases, and on FCC acceptance of the AT&T petition.

Last June, the U.S. Circuit Court of Appeals decided that the commission erred in 1977 when it accepted an earlier phone company request to terminate Telpak. Termination of the service was stayed temporarily by the appeals court later in 1977, which is why Telpak remains in operation.

Last June, the court said basically that the phone company had failed to supply adequate justification in 1977 for ending the service. Now, the FCC has to decide whether the data submitted by AT&T with its latest termination request is adequate.

The phone company, however, contended that its 1977 justification was sufficient, and it has requested reconsideration of that part of the court's June decision.

Anticompetitive Issue

In another part of that decision, the court found that Telpak rates are anticompetitive, thus upholding the position enunciated by the FCC in 1976 when it declared that then-existing Telpak rates – still in effect – were anticompetitive.

This 1976 decision was one of the reasons AT&T decided to terminate Telpak the following year. The other reason was a related FCC decision that permitted sharing and resale of Telpak circuits.

At the root of the anticompetitive issue is the question of whether Long Run Incremental Costing (LRIC) – the method traditionally used by the phone company to allocate its expenses – is anticompetitive.

The FCC says it is and has ordered the phone company to employ Fully Distributed Costing (FDC) instead. AT&T's competitors favor FDC because it loads more costs on private-line offerings, thereby forcing the related rates upward and giving competitors more of an opportunity to compete.

Although the appeals court, last June, agreed that LRIC is anticompetitive, it was a split decision – one of the three judges who heard the case, Malcolm R. Wilkey, indicated that LRIC is not anticompetitive.

The Justice Department agreed with Judge Wilkey, pointing out that this part of the verdict, if allowed to stand, will "force AT&T's private-line rates higher than they would otherwise be, enabling AT&T's competitors to find shelter under this high price umbrella. The impact on ratepayers will be highly significant, with likely increased costs to the federal government of hundreds of millions of dollars each year."



Get the Picture?

The wrong picture ran with the story entitled "CA Adds Double-Performance Syfa 2000" [CW, Sept. 22]. The correct picture is shown above.

IBM 3101 TTY Compatible CRT



1 year rental $56.00/Mo. (California only)

IMMEDIATE AVAILABILITY
PURCHASE PRICE $1195.00
(Limited Offer)

IN STOCK

VISUAL 200 (VT52, ADDS, ADM3, HAZELTINE)	$ 995
VISUAL 210 (PROG. FUNCTION KEYS)	1,095
VISUAL 100 (COMPATIBLE W/DEC VT-100)	1,695
MICROTERM MIME 2A (VT52, SOROC, HAZELTINE)	895
MICROTERM ACT 5A (SMART EDITING, SPLIT SCREEN)	845
MICROTERM MIME 314 (ADM 3, HAZELTINE, ACT IV)	775
MICROTERM MIME 100 (COMPATIBLE W/DEC VT-100)	1,595
DATASOUTH DS180 (180 CPS MATRIX PRINTER)	1,395
212A MODEM (BELL COMPATIBLE)	825

QUANTITY DISCOUNTS AVAILABLE.
CALL (213) 999-2281

PMS Pacific Mountain States CORPORATION

DIRECTORY OF COMPUTER EXECUTIVES
in the New York Metropolitan area
The Who's Who of EDP management in N.Y. Metro area

Features	Benefits
• Over 1900 listings	• Increase sales
• Fortune 500 companies and major non-industrial companies	• Gain competitive edge • Expand market coverage • Locate decision makers
• Company, division, address, contact's name, title, functional area, phone numbers, major hardware installed, major software used, consultants used	• Improve prospecting

Price — $225.00
Order — Detach and mail check to:

COMPUTER MANAGEMENT RESEARCH, INC.
373 Fifth Ave., Suite 1105
New York, N.Y. 10016
(212) 940-9750

Name _____
Address _____
City _____
State _____ Zip ____

FOR SALE
UPS
Uninterruptible Power Supply
Franklin Electric Model 6150
150 KVA
Device Complete With Batteries and Spare Parts Kit
This Year Old Device is Used by a Major Subsidiary of Citicorp To "Clean Up" Utility Power and is Capable of Supporting Critical Loads for a Period of 15 Min.
Contact Rodman K. Reef
Citicorp Services, Inc.
a Subsidiary of Citicorp
3 Dakota Drive
Lake Success, New York 516-574-5832

300 LPM FOR LESS THAN $5000.00



- TOTAL SELF TEST
- 13 COMM PROTOCOLS
- DIRECT MODEM HOOKUP
- ULTRA QUIET CABINET
- NATIONWIDE SERVICE
- COMPATIBLE WITH YOUR COMPUTER

IEI INNOVATIVE ELECTRONICS INC.
15200 Northwest 60 Avenue, Miami Lakes, Fl. 33014
(305) 558-1591 Telex:807121 (800) 327-3955

Port Selector Solves Heavy Traffic Problem For Contract House

LA JOLLA, Calif. — By automating terminal access to the firm's computer's, Science Applications, Inc. SAI went from busy signals on the phone to quick access for computer users.

Using an intelligent port selector, "our computer port utilization increased substantially without adding computer hardware and we gained considerably in our effort to control telephone charges," according to C.E. Burgart, assistant vice-president and manager of the Computer Services Division.

Before SAI turned to automation, terminal access was through dial-up telephone lines, except for a few hardwired terminals at the computer center in La Jolla, Burgart explained. But as the company grew the load eventually reached the point where more than 150 terminals were competing for computer ports, and telephone access was busy eight hours a day.

And growth has been one of SAI's most outstanding characteristics. From a small beginning in 1969, SAI today fields a team of 3,300 people and handles 1,000 contracts per year in complex fields such as national security, energy, the environment, health, systems engineering and software.

Controlled Access

To alleviate the situation, an intelligent port selector was installed between SAI's computer system and the terminal network.

This unit controls and coordinates terminal access to the computers, providing orderly connections between a large number of incoming lines and a smaller number of computer ports at the same time that it allows selection of specific classes of ports from the terminals.

Once the user enters the class designation, the port selector makes the required connection and displays a GO message on the terminal. Or, if the connection cannot be completed, the port selector indicates the reason with messages such as UNAVAILABLE, UNAUTHORIZED, WRONG SPEED and so on.

And if all of the ports in the requested class are in use, the port selector responds with a BUSY message and tells the terminal user how many others are ahead of him so he can elect to wait, in which case he is put in queue and connected automatically when a port becomes available, or he can disconnect and try again later.

Network Heart

The heart of SAI's network is a Micom Systems, Inc. Micro600 port selector that is equivalent to a solid-state version of the cross-bar switches used in most conventional telephone exchanges. The unit operates under direction of a microcomputer that controls all connections and disconnections.

Once a connection is established, the Micro600's operation is totally transparent to the user as the switch transfers data directly from the line to the port at high speed. And the microcomputer controller is only activated again when the connection needs to be broken.

Typically, the microcomputer controller operates according to instructions entered via a command console. Thus, for example, an operator in the computer room can reassign class designations to ports if some are overloaded while others are unused. Or he can alter the messages that the microcomputer uses to communicate with users at the terminals.

Any asynchronous terminal can be connected to the Micro600. It is not necessary for its speed to be known in advance — the Micro600's Autobaud feature provides automatic terminal speed detection up to 9,600 bit/sec.

To the computer port, the Micro600 appears either as a dedicated terminal or as a modem emulating the automatic answering sequence of a Bell 113 CCITT V.21.

Each port interface has a class defined in the Micro600's control memory and, as noted earlier, this class can be modified whenever necessary from the command console.

Interface Combinations

Line and port interfaces can be selected in any combination in the Micro600 — the same card module handles both and a front-mounted thumbwheel switch is used to select the operating mode.

In its present configuration, SAI's Micro600 can handle up to 248 lines and ports. This is expandable to 992 lines and ports as the company's requirements grows.

This capacity is used to control terminal access to the company's Digital Equipment Corp. Decsystem-10 and VAX-11/780 systems in La Jolla, a second VAX-11/780 about five miles away and a PDP-11/70 about eight miles from La Jolla.

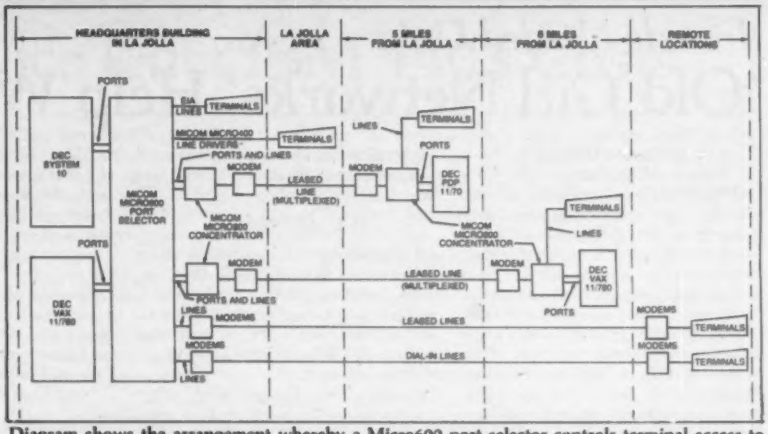


Diagram shows the arrangement whereby a Micro600 port selector controls terminal access to four computers at Science Applications, Inc.



C.E. Burgart, assistant vice-president, points out the line and port interfaces that can be altered by thumbwheel switches.

Price Slashed! New VT52 Video Terminals $1350.

Limited quantity.



If you need data entry or editing terminals, now's the time to buy. And Digital's feature-full VT52 is the one to buy.

A two-mode keypad, one for generating program-compatible numeric codes, the other for invoking user-defined functions. A wide range of cursor functions, including direct cursor addressing. Forward and reverse scrolling. Upper and lower case ASCII. Twenty-four 80-character lines of viewing. A hold-screen mode for file display. Plug-compatibility with other Digital VT terminals.

Priced to sell, designed to perform. New VT52 video terminals. For delivery details, call 800-258-1728 toll-free, 8 to 5 ET (in New Hampshire, Alaska and Hawaii, call 603-884-7240). Sorry, no discounts.

Digital Equipment Corporation
522 Amherst Street
Nashua, NH 03063

digital
We change the way the world thinks.

Provide Needed Links

'Old Girl Networks' Help Women Get Ahead

By Connie Winkler
CW Staff

NEW YORK — Networks are not just for data communications; they also help women get ahead, said Mary Scott Welch, author of *Networking*. Welch was the kickoff speaker at a networking session sponsored here recently by Women in Data Processing.

The networking session was an opportunity for women to meet other women in DP, to trade information, exchange cards, increase contacts and get to know what others in the field are doing, said Denise L. Hassman, president of the women's group.

"Networking is not an extra," Welch said, "it is every bit as important as being qualified or working hard — which women used to think was all that was important."

Help With Problems

If women have a network of other women both in and outside the company, they can call them for help with problems. "Women should work 80% as hard and spend 20% of their time finding out what others are doing," Welch continued.

Women have always used other women to help solve their problems, finding a doctor, for instance. What is new about networking is that it is now career-focused, Welch said.

Today a 27-year-old woman with two children will work 34 years of her life, and if that women is divorced she will work an average of 42 years. So, Welch said, "we might as well get up there and get paid what we're worth."

Old Boys Club

Men have always practiced networking in what is sometimes called the old boys club, Welch said. She gave the example of men helping their fellows find another job.

"Men have always met at conventions, on the golf course, at clubs, schools and colleges. They don't see why we now have to make a big deal about getting together," Welch said.

"We know — we have been isolated from one another. And, the higher you go in a job the more isolated you become. Too often the 'only woman' is a lonely woman."

A woman asking a male colleague for advice is not networking because the male probably is not sensitive to the female's perspective. A man would not understand the woman's concern over being the only woman at a meeting and being asked to take notes.

To use other woman contacts most effectively, Welch suggested several techniques — for example, dropping a third woman's name to an unfamiliar woman you are calling: "I'm calling at the suggestion of Mary Doe." Then, be sure to call Mary Doe back and tell her how the contact went, Welch explained.

Networking Groups

Recently women's groups have been formed just for the purpose of networking. There are both internal networks of women within one company and external networks of women across many industries. Sometimes the internal networks are sanctioned by the companies.

Women should belong to both and realize that the same confidences cannot be shared in each. Special networks for female managers are also starting, Welch said.

A second networking session is planned Oct. 31, 5:30 p.m. to 7:30 p.m. at the Women in Data Processing office, Suite 2008, 310 Madison, Ave., New York. It is free to Women in Data Processing members and costs $5 for guests.

Fifth ICPR Set For Miami Beach

MIAMI BEACH — The Fifth International Conference on Pattern Recognition (ICPR), cosponsored by the International Association for Pattern Recognition and the IEEE Computer Society, will be held here Dec. 1-5.

A preconference tutorial on image processing and introductory pattern recognition concepts will be featured. Among conference speakers are King-Sun Fu and Keinsuke Fukunaga of Purdue University, and Robert Haralick of Virginia Polytechnic Institute and University.

Registration prior to Nov. 11 is $245 for members and $265 for nonmembers, while late registration is $285 and $305 respectively. Additional information and a complete preliminary program can be obtained by writing 5 ICPR, P.O. Box 639, Silver Springs, Md. 20901.

Time is precious
Why lose it?



BATTERY SUPPORTED CALENDAR CLOCKS

PDP-11[1] ..... TCU-100 • $495
..... TCU-150 • $460
LSI-11/2[1] ..... TCU-50D • $325
Multi-Bus[2] ..... TCU-410 • $325
EXORcisor[3] ..... TCU-68 • $325
HP 2100 ..... TCU-2100 • $395
Lockheed SUE ..... TCU-200 • $550
Naked Mini[4] ..... TCU-310 • $385



Serial Line Clock ..SLC-1 • $640
(RS 232 or 20mA) Microprocessor controlled. Auto message intercept and response. 10 Digit display option $190.

If automatic and accurate date and time entry is important to your system on power-up — you need a Digital Pathways battery supported calendar clock. All Digital Pathways' TCUs have on board NICAD batteries to maintain date and time during power down (typically up to three months). Timing is provided by a crystal controlled oscillator. Prices are U.S. domestic single piece. Quantity discounts available.

For more information on these timely products, contact:

Digital Pathways Inc.
4151 Middlefield Road
Palo Alto, CA 94306
Phone: (415) 493-5544

[1] Trademark of Digital Equipment Corp.
[2] Trademark of Intel Corp.
[3] Trademark of Motorola Inc.
[4] Trademark of Computer Automation Inc.

DIGITAL PATHWAYS

Perkin-Elmer
FOX 1100's NOW! Limited Offer
$895.
QWIKTERM
Boston (617) 246-1665
San Francisco (415) 461-0923
Washington, D.C. (703) 522-1210

Do-It-Yourself Service Cuts IBM 1403 Costs

GREENVILLE, S.C. — A do-it-yourself service contract can reportedly save a user as much as $294 per month in maintenance charges on an IBM 1403 printer.

If you have a 1403 that requires a controller in order to operate with non-IBM mainframes, a new application in use here at Bob Jones University could well cost you significantly less than $369 per month maintenance cost.

The university has a Burroughs Corp. B1800 and printer but needed the higher quality typefaces available on the IBM 1403 to process applications that required optical character recognition (OCR) scanning.

The university's electrical engineer, Brent Reed, found that with a Spur Products Corp. controller and the 1403 printer, servicing could be done simultaneously by slight modification to the controller and by using Spur's tester/-exerciser program at a cost of $75 per month.

The maintenance program includes the use of the tester/-exerciser to check the controller, a kit of spares and unlimited telephone advice from Spur's electronics staff.

"You don't need a great deal of expertise to manage the do-it-yourself program," Reed said. "It is not a very complicated system, and it's so convenient. It is really somewhat idiot-proof."

A former IBM employee on the univesity's staff who specialized in 1403 printer maintenance taught Reed how to service the printer, and Spur provided a training course for the do-it-yourself program.

The controller modification that Reed designed for "operational convenience" may be incorporated into Spur's new controller design, Spur president Ray Lorenz said.

The modification can prolong the life of the printer chain by automatically stopping if it does not receive signals from the computer for 20 seconds. This saves on wear to the chain and on energy, according to Spur.

Spur provides training for site personnel at the time of the controller's installation or at its Los Angeles office at a cost of $500.

Instead of leasing the tester/-exerciser and spares kit, both can be bought for $2,530 and $4,250 respectively. The controller costs $20,125, the vendor said from Spur Products Corp., 1904 Centinela Ave., Los Angeles, Calif. 90025.

Bell System Gets Honeywell DPS For Training Site

LISLE, Ill. — A Honeywell, Inc. Level 66/DPS/C5 dual processor computer system has been installed at the Bell System Center for Technical Education (BSCTE) here.

Valued at about $2.4 million, the Honeywell configuration runs under the CP-6 operating system, which the vendor developed as a growth path for users of the Sigma series computers originally made by Xerox Corp. but backed by Honeywell since 1976. The Level 66/DPS/C5 replaced a three-processor Sigma 9 that ran under CP-V.

Able to accommodate 200 users simultaneously, according to a Honeywell spokesman, the Level 66/DPS/C5 has eight 200M-byte disk drives, three 6,250 bit/in. tape drives, a 1,050 card/min card reader and a 1,600 line/min printer.

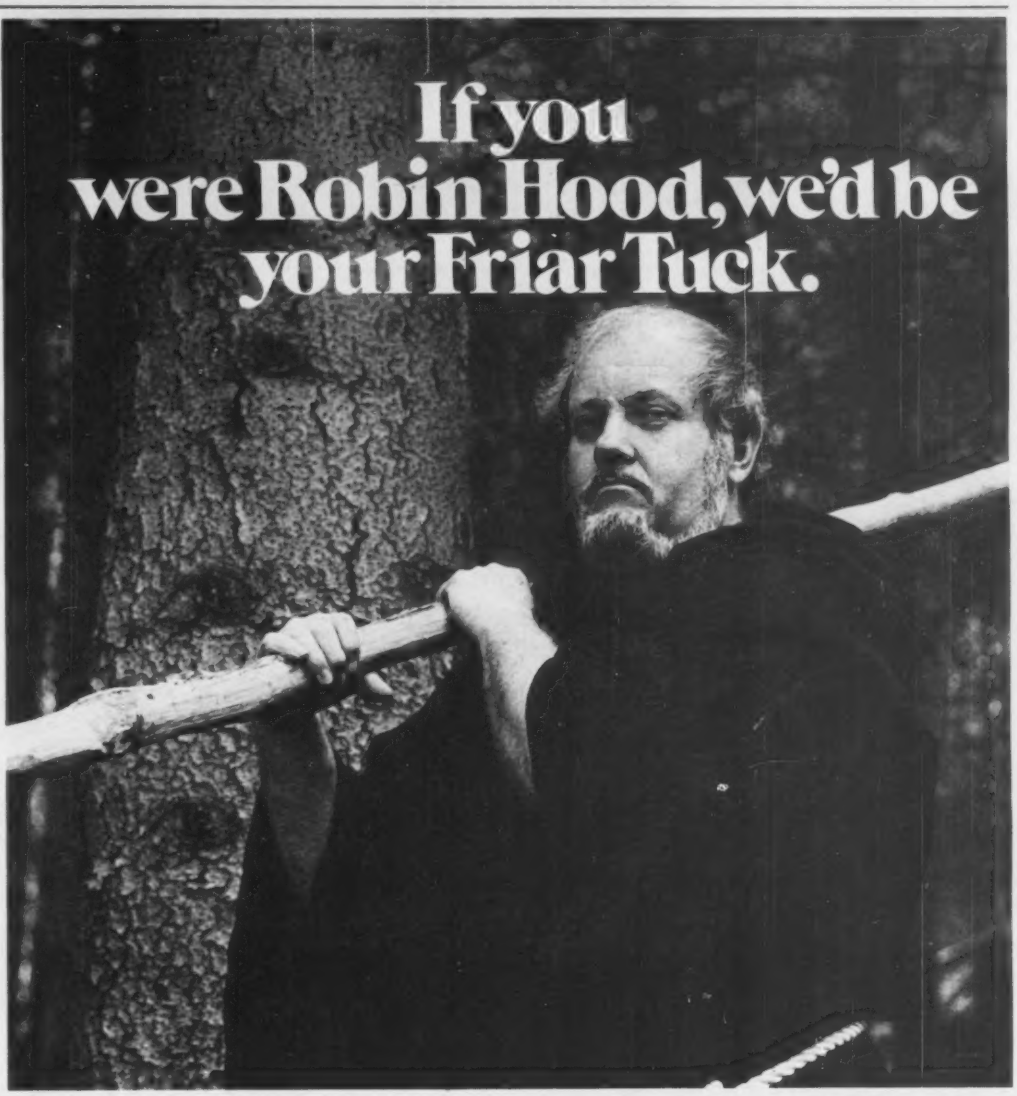
The BSCTE is the main technical training facility for the Bell System's 23 operating companies and is said to provide about 40,000 student weeks of education per year.

The center plans to upgrade the Level 66/DPS/C5 to a C7 system later this year, boosting its capacity to accommodate 280 users simultaneously by the addition of about $1.2 million worth of equipment.



"I LOVE MY COMPUTER" Statues

Now choose from five models: IBM 370, NCR Century, System/3, "plain" (pictured above) . . . or the new "I HATE MY COMPUTER" which shows a frustrated OP'er strangling his system! Gold-finished, hefty plaster sculptures, perfect paperweight/conversation pieces. $9.95 each, postpaid. Brian Productions, 2949 Southfield Rd., Xenia, Ohio 45385



Time after time, Friar Tuck helped Robin out of some pretty tough scrapes. And Robin came to depend on the feisty friar in a special way.

Today, Avanti has a similar reputation for dependability. In local data distribution equipment.

A case in point: our new 2200 LADD Line Driver.

It was created especially for local high-speed data distribution and performs impeccably over unloaded metallic circuits. Available with all standard interfaces, the 2200 comes in a desk-top or compact rack mount configuration, and features:

- Complete compatibility with the Bell LADS unit
- Synchronous operation with asynchronous option
- 8 selected data rates up to 64 Kbps (19.2 Kbps asynchronous)
- Total self-diagnostic capability eliminating the need for external test equipment
- Conformation to Bell Publication 43401

The 2200 is Avanti's newest product. But it's by no means our only one.

In fact we make an entire family of the most advanced modems and line drivers in this business. So we can provide the exact product you need.

You might say, we're big enough to supply even your smallest needs. For the facts on our new 2200 or on our full line, write Avanti Communications Corp., Aquidneck Industrial Park, Newport, RI 02840. Or call: (401) 849-4660.



AVANTI

Avanti Communications Corp., Aquidneck Industrial Park Newport, RI 02840, Tel: (401) 849-4660, TWX: (710) 387-6543

We're always here when you need us.

Net Doubles University's Computer Capacity

IOWA CITY, Iowa — The Weeg Computing Center at the University of Iowa here is using four interactive computer systems grouped in a network to process both academic data and several business applications for the university.

More than 9,000 students, faculty members and university staff representing 10 different colleges within the school use the Weeg Center for applications spanning ophthalmology research and radiation protection analysis to career guidance and test development and administration for the Iowa Testing Program.

The University of Iowa began offering free access to instructional computing in 1962 when it opened the University Computing Center, renamed the Weeg Computing Center in 1978. By 1977, with more than 23,000 graduate and undergraduate students, the university had run out of computing capacity and was purchasing 20% of its computing time from outside services at a cost that was stifling.



The University of Iowa's Weeg Center, housed in the school's Lindquist Center for Measurement, is used by more than 9,000 students, faculty and staff members for applications spanning ophthalmology research to career guidance development.

The existing vendor's system did not have the software necessary to allow the university to develop its own programs, James Johnson, director of the Weeg Computing Center, explained. Every application had to be custom-programmed.

The university needed a system that was both interactive and had state-of-the-art software, a data management facility and interactive data analysis and development capabilities. The system also had to be compatible in an IBM environment that included an IBM 370/168 system. Because the university has a heavy investment in software development and trained users on the IBM system, Johnson had to find a system that would protect that investment.

Prime Picked

"After assessing the systems of several vendors, we found Prime Computer, Inc.'s networking approach and an attitude toward system compatibility that was close to our own," Johnson said.

"And because Prime adheres to standards in its language compilers and X.25 packet-switching network, we could be less concerned with software conversion problems in the future."

The University of Iowa purchased four Prime 750 systems to replace a Control Data Corp. Cyber 70/71 that had been used in-house for four years. The Prime systems are connected to each other in a local ring network and to the IBM 370/168. This ring network enables file transfer among systems and access to software on other computers on the ring.

Each Prime system is configured with 2M bytes of main memory, three 300M-byte storage module disk drives and two additional 300M-byte disk drives for system backup. In addition, the four Prime systems are connected to two line printers, two tape drives and other peripheral equipment accessed through the IBM 370/168.

The university has over 300 terminals — clustered and individual — located throughout the 15-sq-mile campus and plans to increase that number to 500 by the end of 1982. Users are assigned to individual Prime systems in order to balance the computing load and access them using a communications switch. Each Prime 750 system can support up to 63 users simultaneously running different applications.

The Prime network is, in many cases, totally transparent to the user. If a student logs onto one Prime system and later has to change over to another, the network performs the file transfer.

This multiaccess capability significantly increases the ease-of-use and reliability of the Prime systems. And the computational power the network delivers approaches that of the IBM 360/65, he maintained.

This advertisement is neither an offer to sell nor a solicitation of offers to buy any of these securities. The offering is made only by the Prospectus.

NEW ISSUE / September 26, 1980

500,000 Shares

International Power Machines Corporation

Common Stock

Price $9.50 Per Share

Copies of the Prospectus may be obtained from such of the underwriters as may lawfully offer these securities in this State.

Rotan Mosle Inc.

Bache Halsey Stuart Shields Incorporated
The First Boston Corporation
Bear, Stearns & Co.

Blyth Eastman Paine Webber Incorporated
Donaldson, Lufkin & Jenrette Securities Corporation
Drexel Burnham Lambert Incorporated

E. F. Hutton & Company Inc.
Kidder, Peabody & Co. Incorporated
Lazard Frères & Co.

Lehman Brothers Kuhn Loeb Incorporated
L. F. Rothschild, Unterberg, Towbin

Shearson Loeb Rhoades Inc.
Smith Barney, Harris Upham & Co. Incorporated

Warburg Paribas Becker A. G. Becker
Wertheim & Co., Inc.
Dean Witter Reynolds Inc.



The Russians offered a $500,000 bribe to steal a DBMS.



That DBMS is ADABAS.

Of course, they didn't succeed in stealing our source code. With the help of the FBI, we stopped them. But it was front page news–both in Computerworld and The New York Times. And we think it's dramatic proof of the value of ADABAS.

We're the talk of The Times.

Compliments sound better coming from someone else, so we'll quote The New York Times: Software AG's ADABAS is "extremely sophisticated" and "even competitors acknowledge it to be one of the best."

What's more, ADABAS "reduces the amount of [computer] time by two-thirds or more" and "can even reduce the size of the computer needed to carry out a task, thus saving both capital expense and operating costs."

ADABAS is invaluable.

We've made the Datapro Honor Roll for three consecutive years. And feature for feature, no other DBMS can match ADABAS. It's easy to use, with all the components you need in a sophisticated DBMS:

- On-line query.
- On-line data dictionary.
- Report writer.
- High level language interface.
- All the utilities necessary to load a data base.

And ADABAS is totally flexible. You don't have to spend time re-loading when data changes. So your program development is faster and easier.

Find out what the Russians wanted to steal.

We could go on, but why not find out for yourself? We'll be glad to schedule a free demonstration at your convenience. Or we'll send you our latest brochure. Just call us or return the coupon.

Incidentally, you can get all the advantages of ADABAS for a *fraction* of what the Russians were willing to pay!

ADABAS. The Russians weren't smart enough to invent it... but they know enough to want it.

SOFTWARE AG
OF NORTH AMERICA, INC

Reston International Center
11800 Sunrise Valley Drive
Reston, Virginia 22091 (703) 860-5050

I'd like to beat the Russians to ADABAS!

- ☐ Send me the whole story of the Russian attempt.
- ☐ Please call to arrange a free presentation.
- ☐ Please send me your latest brochure.

Name _____
Title _____
Company name _____
Address _____
City _____ State _____ Zip _____
Telephone (area code) _____ Best time to call _____
Type of computer _____
Operating system _____

106

Diebold Receives 1980 DPMA Sciences Award



John Diebold

PHILADELPHIA — John Diebold, internationally known authority on management as well as automation and information technology, has been selected as the 1980 recipient of Data Processing Management Association's (DPMA) Distinguished Information Sciences Award.

The award will be presented to Diebold during the DPMA's international conference in Philadelphia Oct. 26-29. The presentation will take place at the award luncheon Oct. 29.

First given in 1968 when it was known as the Computer Sciences Man-of-the-Year Award, this honor is bestowed in recognition of outstanding contributions to the field of information processing. The selection is made by DPMA's executive council from nominations submitted by DPMA chapters, but is not limited to DPMA members.

Diebold is chairman and founder of the management consulting firm, The Diebold Group, Inc. of New York. He has served or is management counsel to such organizations as Xerox Corp., Westinghouse Corp., IBM, General Electric Corp., DuPont and Eastman Kodak Co., as well as hundreds of other foreign and domestic firms.

According to the DPMA, Diebold was so enthralled by the precision of remote-controlled antiaircraft guns during his Merchant Marine assignment in World War II that automation became a major focus in his life. He studied commercial applications of automatic-control mechanisms at Harvard and published *Automation* when he was 26.

Business Record

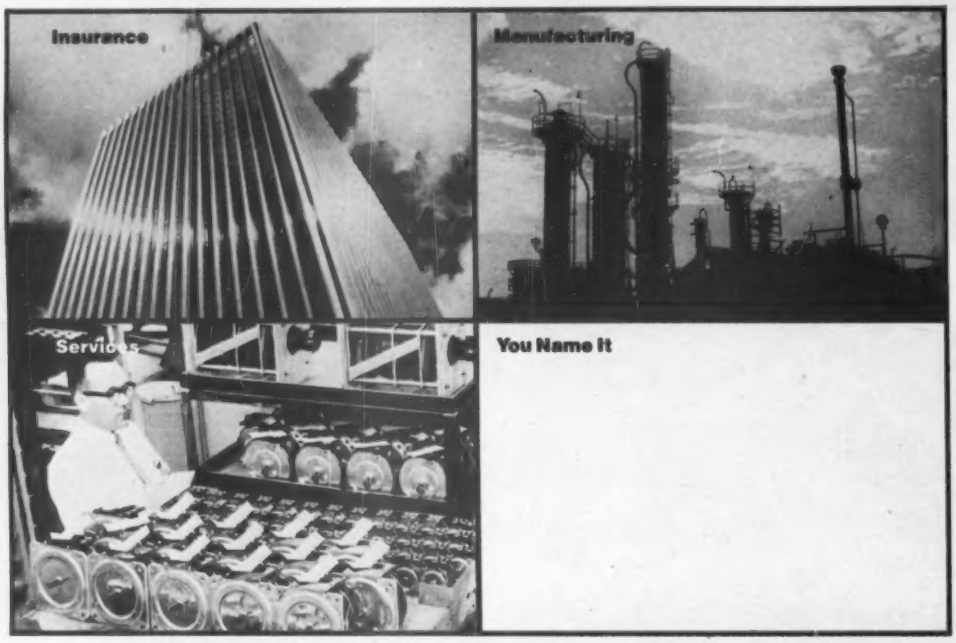
After a brief internship with the oldest U.S. management consulting firm, Griffenhagen & Associates, Inc. of Chicago, founded in 1911, Diebold established his own company in 1954. He bought out Griffenhagen in 1957 and began operations in Europe the following year. Today, The Diebold Group has more than 600 employees and offices in the U.S., Frankfort, West Germany, Paris, Vienna, Austria and London.

Through a partnership with Rothschild Freres in France (Diebold France S.A.) and its other European operations, the Diebold organization has roots in Europe and the UK.

Diebold holds honorary doctorate degrees from three colleges. Among his honors are the U.S. Junior Chamber of Commerce Award winner as one of the Ten Outstanding Young Men of 1961, and one of *Life* magazine's 100 up-and-coming "Take-Over Generation" in 1962.

He is a founder and leader in various societies and foundations concerned with the growth and development of management and technology. He has addressed a large number of U.S. and international professional, business and governmental meetings.

When it comes to companies...



companies come to Cyborg.

And at present, more than 4,000 companies have come to Cyborg for its one-of-a-kind payroll/personnel system... for some 4,000,000 employees.

We picked a few areas to highlight above, but as you can imagine, virtually every type of business, industry and organization; banking, transportation, food processing, retailing, government, service bureaus ... organizations of all kinds have come to Cyborg for our system's efficient, speedy general payroll and personnel handling capabilities.

For example, the Cyborg System handles more than 300 types of earnings *per employee* with job related rates and special taxations. Hourly, salaried, weekly, bi-weekly, semi-monthly, monthly ... any user-defined frequency required.

The system is designed for large corporations; multi-company firms; multi-location firms and service bureau organizations. Handles taxes on a federal basis, for all 50 states and thousands of counties and cities ... and Canadian taxes for Federal, CPP, QPP, UIC and provincials.

In addition, the Cyborg System keeps current, monthly, quarterly and year-to-date tax and earnings figures on all employees in all locations, plants or locales.

Why not look into the Cyborg Payroll/Personnel System for *your* needs. Available online or in a batch environment. Call us today, or drop a line. Join the successful companies who're joining Cyborg.

Cyborg Systems, Inc.

When it comes to people...people come to Cyborg.

21st Floor/2 North Riverside Plaza/Chicago, IL 60606/(312) 454-1865/In Canada 2742 Ross Avenue, Cornwall, Ontario K6K 1E5/(613) 938-7431/2091 Business Center Drive/Irvine, California 92715 (714) 955-0870

Human at Fault, Not Computer

MINNEAPOLIS — Although the initial reaction was to blame the computer, it was human error that caused about 1,300 glass panels to be made 3 in. too long for their aluminum frames in the 17-story Lutheran Brotherhood Building under construction here.

The Pittsburgh-based glass manufacturer PPG Industries, Inc. realized its mistake after 128 oversized opaque spandrel panels were delivered to the building site. Unfortunately, the glass cannot be cut to size, so the panels will have to be remade.

"It's hard to figure out how the mistake occurred, but it wasn't a computer error. The wrong dimensions were given to the machine," a PPG Industries spokeswoman said. The job entailed making 8,277 panels out of which 1,278 were too long.

BGS User Group To Meet Dec. 1

BOSTON — The first meeting of the BGS Systems, Inc. Users' Group will be held here Dec. 1 — which coincides with the Computer Measurement Group (CMG) national conference also scheduled in Boston Dec. 2-5.

Group members include domestic and international users who have installed Best/1 on compatible IBM, Univac, Burroughs Corp. and Honeywell, Inc. mainframes. Fifty members of the group are IBM MVS installations which have also installed Capture/MVS.

Additional information can be obtained from Dr. Robert Goldberg at BGS Systems, Box 128, Lincoln, Mass. 01773.

Settlement Status Uncertain

'Paper Chase' Escalates in IBM Antitrust Trial

By Connie Winkler
CW Staff

NEW YORK — Both sides in the U.S. vs. IBM antitrust trial are chasing each other with paper while the status of the settlement negotiations remains uncertain.

IBM's latest paper wad was about 4,000 pages in statements by its four expert economic witnesses, the seventh installment of which was delivered recently. Now the Justice Department wants 30 days to decide what to do with these weighty statements, although it is also expected to respond in writing.

Even though the last settlement discussion was June 7, Justice Department spokesman Mark Sheehan said he does not believe the talks have broken down.

No Comment

IBM would not comment on the status of the settlement talks. "We are not going to comment or speculate," a public relations spokesman at Armonk, N.Y., said. This has been IBM's practice in the past, he added.

"These narratives go beyond what one would reasonably expect an economic witness to do and to say. These are lawyer-like arguments," said Robert J. Staal about IBM's economists' statements.

At a robing room meeting with Judge David N. Edelstein, the head Justice Department lawyer said he had many problems with the statements and wanted to reserve his options to make objections or cross-examine the experts.

The statements are not available to the public because they have not been introduced as exhibits in court.

As it stands, the government will probably respond through its own economists' narratives in the coming rebuttal case which will also be in writing, Staal said.

IBM's head counsel Thomas D. Barr said he could not complete his affirmative case until the government decides on the economists' statements.

Negotiations are still under way to present previous testimony in West Coast case antitrust cases by Patrick J. McGovern, chairman of International Data Group, in lieu of live testimony in this case. McGovern would be a government rebuttal witness.

The government is also working with Gene Amdahl for his direct rebuttal testimony.

Acpa Seminar Fee Covers Admission To Mini-Micro

SAN FRANCISCO — Three information processing seminars will be offered at the 10th Annual Conference of the Association of Computer Programmers and Analysts (Acpa) here on Oct. 12-14.

"Improving the Programmer's Efficiency" is the title of James Towsen's session; "It's All in the Way You Look at Things," given by Robert Kuehne, will deal with strategies, structures and systems theory; and "Software Maintenance" will be addressed by Girish Parikh, Cris Miller and Michael Lyons.

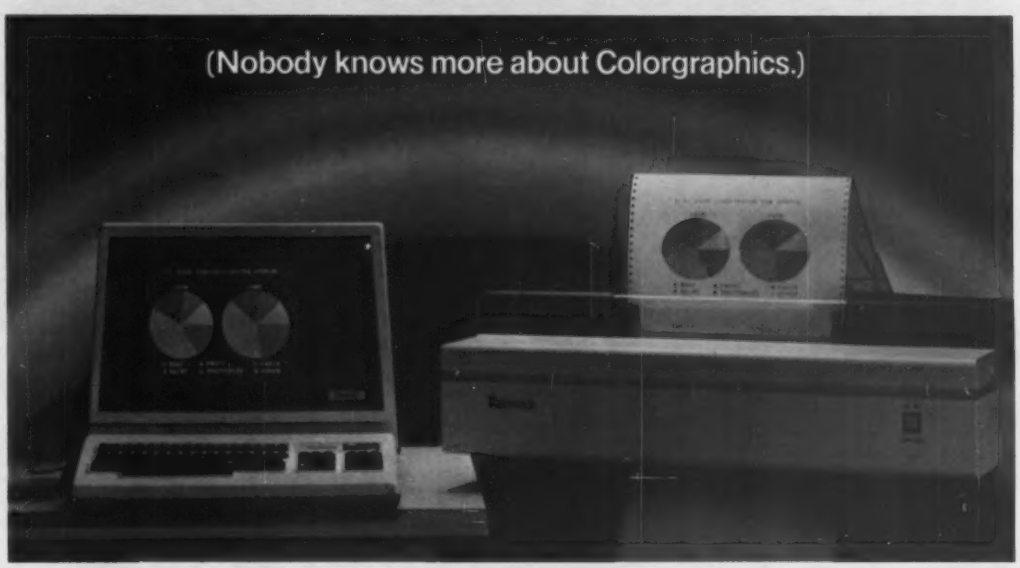
Seminar registration for non-Acpa members is $225, which includes a year's membership to that organization. For members, seminar enrollment is $190.

Fees include admission to the Mini-Micro conference that immediately follows the Acpa event. Further details are available from Acpa headquarters at 294 Main St., E. Greenwich, R.I. 02818.

CICS COURSE
HANDS-ON COMMAND LEVEL
held in New York City,
the start of each month.
CICS INTERNALS COURSES
and IN-HOUSE COURSES
also available.

VERHOEF INF. PACKAGES, INC.
28 Hathaway Lane
Essex Fells
N.J. 07021
U.S.A. (201) 228-0114

Ask Ramtek.



Now, Ramtek offers the first integrated system for MIS graphics users.

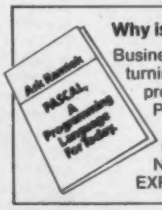
Ramtek's new 6214 color graphic computer frees you from buying each of your display elements from a different supplier. Ramtek has put it all together in a true stand-alone color graphics system complete with processor, monitor, console, mass memory storage and UCSD Pascal.™ And full Ramtek support with field service, training and documentation.

You'll get a sharp, bright picture.
The 6214 gives you high resolution—640 x 512 refresh memory for smooth, curved plots. Choose 16 colors from a palette of 64, with no annoying image flicker.

Interactive UCSD Pascal makes programming easy.
Complex programming is simplified with Pascal. Adding Ramtek's GRAFPRO (graphic procedures) software package provides the basic drawing functions, programmable patterns and text fonts you need. To dramatically speed applications software development.

Now, low-cost plain paper and photographic hardcopies.
The new Ramtek 4100 printer/plotter cuts the cost of hard copy. Ramtek's unique four-head design prints full color graphics on plain paper in a single pass. No toners or chemicals are required, and to change ribbons you simply drop in a new cartridge. Add a color camera for transparencies, 35mm slides, and 16mm film.

For MIS, computer-aided design or any application that requires high resolution, high-performance color graphics, look into Ramtek's 6214 colorgraphic computer. To get more information, write: Ramtek, 2211 Lawson Lane, Santa Clara, CA 95050.



Why is Pascal better for business?
Business, industry and education are turning to Pascal for their interactive programming needs. To find out what Pascal offers and how it can benefit you, request "Pascal, A Programming Language For Today." It's Issue Number 1 of Ramtek's "USE OUR EXPERIENCE" series.

Ramtek
Our Experience Shows.

REGIONAL OFFICES: Santa Clara, CA (408) 988-2211, Newport Beach, CA (714) 979-5351, Seattle, WA (206) 838-5196, Albuquerque, NM (505) 884-3557, Dallas, TX (214) 422-2200, Maitland, FL (305) 645-0780, Huntsville, AL (205) 837-7000, Chicago, IL (312) 397-2279, Cleveland, OH (216) 464-4053, Washington, DC (301) 656-0350, Metropolitan NY (201) 238-2090, Boston, MA (617) 273-4580, Netherlands 31 2968 5056.

University, Firms Join in Systems Ed Venture

ST. LOUIS — In an effort to meet the needs of local industry for data processing staff, Washington University and 23 corporations have joined forces to establish the Center for the Study of Data Processing here.

"About five years ago I began talking with DP managers in St. Louis, and out of those discussions came the conviction that some kind of cooperation would be possible and would be helpful. So in the spring of 1976 we began running a seminar series," said Robert Benson, assistant vice-chancellor of Washington University and director of the center.

By 1978 the center formally brought together under one roof the degree programs in DP offered by the university and the new seminars.

New programs added to the curriculum catered to the concept of corporate affiliation. A 20-day intensive Cobol course was introduced specifically for corporate staff wishing to change positions in their companies.

An intensive two-year, part-time degree course is geared to people wishing to change professions and enter the information processing field.

The year's budget of $250,000 is made up from corporate affiliates' subscriptions, some fees for the four-credit degree courses offered and the fees paid for seminars, which are open to anyone interested.

Two-Way Relationship

"It is very much a two-way relationship with the corporate affiliates. They benefit from having access to the programs and we can draw upon the experience and the values of the 23 companies, which has a tremendous impact on the quality of our course," Benson said.

The companies come from all areas of industry ranging from banks and chemical companies to information services, social services and consumer product manufacturers.

Since the center's inception, it has graduated 150 B.S. candidates and 34 masters of data processing, 65 from the intensive degree course, and 95 people have completed the 20-day program.

Univac's Joseph To Address Meet On Benefit Plans

LAS VEGAS — Among the 13 speakers that will address the International Foundation of Employee Benefit Plans' 1980 EDP Institute on Oct. 13-15 are Earl Joseph, staff scientist-futurist at Univac; Richard Kaimann, professor and chairman of the Management Department at Marquette University; Ken Miller, administrator of the Carpenter Funds Administration Office; and Jerone Deverman, president of Medical Data Systems.

The conference was designed for employee benefit plan trustees, salaried and contract administrators and administrative personnel with DP responsibilities.

Registration fees are $300 for foundation members and $375 for nonmembers. Additional information can be obtained from the foundation at P.O. Box 69, Brookfield, Wis. 53005.

Clinic to Focus On Improvements In Data Handling

SAN FRANCISCO — Cost reduction and productivity improvement will be the central topics of a clinic organized by Information Architects, Inc. here Nov. 17-19.

The program will be conducted by Information Architects' president, Al Tauber, who specializes in combining graphics (the technology of microfilm and microfiche) with computer technology to achieve cost-efficient information storage and retrieval.

Participants will complete a survey before attending the Tauber clinic, citing their specific problems in information handling. These cases will serve as course material for which solutions will be formulated during the program.

A company can enroll up to three employees in the clinic for $1,000, which includes all materials. Further information is available from the sponsor at 582 Sand Hill Circle, Menlo Park, Calif. 94025.

Why Arizona State University decided not to upgrade their mainframe to meet computer demands.



Distributed Processing with Digital. The right system for the job. Every job.

As user demands grow, it can be tempting to get a headstart on future demand by upgrading an existing batch-oriented mainframe. But it's not always the smartest strategy.

For example Arizona State University had been using a mainframe exclusively—both for academic timesharing and for more complex research. So when timesharing demands skyrocketed, their inclination was to upgrade their mainframe.

Instead, they chose a different approach. Distributed processing. A strategy that allows them to solve individual needs and problems with individualized systems. Rather than one single upgrade, they added three dedicated, interactive PDP-11/70 computers. One each for their colleges of Engineering, Business and Liberal Arts. This distributed approach was a much more functional solution to their problems. Not only did it allow them to tailor each unit to its specific application, it gave them flexibility for the future. Now they can add and reassign computers effectively and cost efficiently.

Distributed Processing with Digital means not wasting your mainframe.

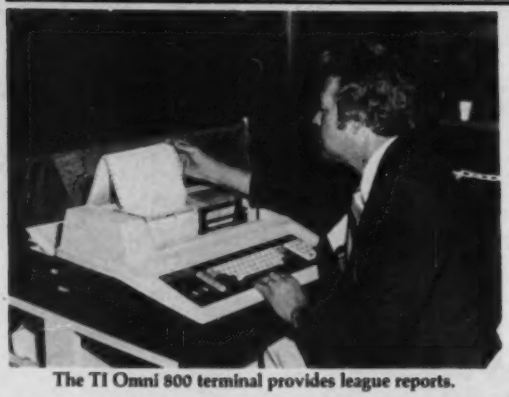
"We don't use the PDP-11/70 systems for all our academic applications," explains Darel Eschbach, Director, Computer Center. "But we use them for the very large number of smaller timesharing jobs needed by the various departments on campus. Most undergraduate timesharing is now on Digital's systems. The mainframe computer we now reserve for higher level computing for batch-oriented applications. Thus we've been able to realize an increased effectiveness in the use of all our computer facilities."

James Hershauer, Professor of Quantitive Systems in the Business College likes the interactive capabilities his PDP-11/70 provides. "I estimate that nearly one-third of the students in programming courses have never done anything on a computer. That's why the PDP-11/70 is so valuable. He e are students sitting down to program for the first time in their lives. Perhaps they'll make 10 passes before they have a successful program. It helps them to have the immediate response of the timesharing system."

Distributed Processing with Digital means more availability.

Max Ivey, Director of Academic Computing Services, sees the PDP-11/70 systems solving future demands too. "We do see some probable areas of growing use as in research and statistical applications. Availability is what makes these systems so appropriate for academic use. They're perfectly suited to do the type of work that students do," he concluded.

So when Arizona State opted for distributed



The TI Omni 800 terminal provides league reports.

Terminals Roll Perfect Scores For Professional Bowlers

HOUSTON — While bowling is for most enthusiasts a leisure sport, the statistics of the game are serious business for the professional bowler.

In recent years, many bowling centers across the nation have converted to computerized score-keeping systems, but AMF, Inc., an equipment supplier to the bowling industry, is using Texas Instruments, Inc. data terminals to provide a system specialized for bowling called Datamagic.

By integrating a microprocessor with the Texas Instruments Omni 800 Model 820 Keyboard Send Receive (KSR) data terminal, Datamagic enables the bowling center proprietor to provide scoring information to bowlers.

In addition, AMF offers the owner several opportunities to manage and promote his business more efficiently.

"League bowlers used to wait a week for printouts, which are used to keep track of bowling averages, high and low games, team standings, handicaps and scratch averages.

"With Datamagic and the 820 KSR, bowlers can have scoring printouts within minutes," Bill Bogard, AMF's director of product engineering, said.

Manager Access

When a bowler completes a game, the Magicscore unit transmits the information from the bowling lane to the Datamagic data base in the manager's office. The scoring data is retrievable by keying in a request on the 820 KSR, and the bowling center owner or a league secretary can receive a scoring printout.

The 820 KSR Data Terminal can provide up to five legible copies simultaneously at 150 char./sec printing speed, Bogard said.

In addition, the TI data terminal has a 1,280-char. buffer which helps Magicscore to transmit figures for league reports. The buffer, a "short term" data storage, ensures that all transmitted data will appear on the printout, Bogard noted.

"We chose the 820 KSR for the Datamagic system because, with its compact size, it easily adapts to the bowling manager's office," Bogard said.

"But, most significantly, Datamagic can be used as a marketing tool to increase business. One important marketing function Datamagic performs with the assistance of the 820 KSR is recording demographic information about bowlers," Bogard said.

Once the demographic data is entered into Datamagic, the operator can access the host computer through the terminal to target specific markets. The manager can then take the information and inform bowlers of upcoming tournaments and special events.



processing, they got several advantages.

First, the PDP-11/70 systems were tailored to their tasks. With interactive capabilities that made it easier for new students to learn. The university was also able to use their new and existing systems in a much more cost-efficient manner, and subsequently installed 3 additional units.

Distributed Processing with Digital means more flexibility.

Distributed processing lets universities like Arizona State evaluate and meet their needs on a simple, year-to-year basis. They can purchase different capabilities as required by different applications, adding and reassigning computers to meet their demands. Which means they'll never have to commit to more (or less) computer than they need.

This is just one example of how Digital is committed to making the computer a practical, economical and accessible tool for education. We offer the industry's broadest and most widely used family of educational computers—from entry-level minis to 36-bit mainframes. Plus the networking tools to tie them together.

Our upward compatibility lets you grow in manageable, logical steps instead of awkward, costly leaps. It also lets you steadily increase services while protecting your basic investment.

And that's about the smartest strategy you'll find. Anywhere.

To find out more about the company that makes distributed processing an economical solution to your computer demands, simply fill out and return this coupon.

Name _____

Title _____

Name of School _____

Address _____

City _____

State _____ Zip _____

B-18-8-0

Mail to:
Digital Equipment Corporation,
Education Computer Systems,
Media Response Manager,
129 Parker Street, PK3-2/M94,
Maynard, MA 01754
In Europe: 12 av. des Morgines,
1213 Petit-Lancy/Geneva



EC-26-EA-18943-87/80

Distributed processing with Digital. The strategy that meets your demands as well as your budget.

digital

GRAPHICS SOFTWARE
for
PRINTRONIX/TRILOG
PRINTERS

ALL MAJOR COMPUTERS

CERRITOS COMPUTER SERVICES, INC.
4320 Atlantic Ave., Dept. A
Long Beach, CA 90807
(213) 595-8607

Systems House Misjudged 'Shortcuts'

Early User's Series/1 Phase-In Not So Smooth

BRIARCLIFF MANOR, N.Y. — When a systems house suggests a newly introduced product to a client, it may encounter teething troubles. The benefits can be substantial, however, when the problems are worked out.

What happens, though, when the guinea-pig user is not quite so happy? When, for example, the system is expected to be installed in nine months, but it takes two years?

The IBM Series/1 was in its infancy in 1977 when the Systems Guide, Inc. suggested that Commodity Research Bureau (CRB), a Wall St. publisher specializing in commodity information, install the machine. Although the minicomputer was not specifically suggested by IBM for CRB's particular environment, the Systems Guild "felt that the possible advantages outweighed the disadvantages. However, we underestimated the difficulties in taking the shortcuts," Charles Chriss, president of Systems Guild, recalled.

Phase one of the system installment involved rewriting 40 Cobol programs from an IBM 370 time-sharing facility. According to Systems Guild, this has already proved cost-effective.

Phase two, which is nearing its end, is the conversion of a mail order and subscription fulfillment operation from a service bureau to the in-house minicomputer. Additions and further applications to the project have caused delays, but the deadline is now almost a year overdue.

First Problems

The first problems came with establishing an operating system that would facilitate the use of PL/I under RPS. Systems Guild eventually turned to IBM for help, and a systems engineer came up with what the guild called a "primitive version of EDX."

The Systems Guild was delighted." Since it is IBM policy "not to act as a development arm with a third-party programmer," according to an IBM spokesman, the guild was getting more than the usual third-party contract allows for. IBM generally provides a list of tasks for the third party and will participate in regularly scheduled planning reviews, if desired.

The Systems Guild, after the initial aid, was therefore left on its own to solve the problems. It developed support programs such as a screen support, decimal arithmetic and an indexed access method (IAM).

According to marketing manager David Silver, the initial headaches "were worth it in a lot of ways. Aside from being able to handle our clients' work, we sold IAM to other users."

So eventually CRB got what it wanted and the Systems Guild found a new product to market. However, CRB thinks it may encounter more problems in the future.

"The Series/1 is sometimes a little small for our purposes," a CRB spokeswoman said, "and perhaps we could use a bigger machine. In the future I think we will have to get another one."

Which gets back to the Systems Guild's first concern that the minicomputer may not have been the right system for the CR^3 environment. It did make its choice work, but CRB suffered and may now have to expand its system sooner than anticipated.

Oil Rig's On-Board Micro Sizes Up Data on Drilling

HOUSTON — Each morning, Occidental Petroleum Corp. in Houston receives a drilling report prepared by a personal computer. The report comes from Transworld 61, the largest semi-submersible oil rig in the world, in the Gulf of Mexico, 100 miles south of New Orleans.

The Apple Computer, Inc. Apple II, selected by Geotech, Inc. of New Orleans, collects and analyzes drilling data from instruments and sensors placed throughout the rig.

Sensors on the mud pumps — used to drive the drill bit — monitor flow rate, mud temperature and density. Other sensors measure drill pressure and drill location as well as pressure build-up in the drill hole area, which could lead to blowouts. In addition to continual tracking of subsurface data, the computer also monitors instruments in the laboratory on the rig's platform: gas-liquid chromatographs, PH meters and ion-measuring devices.

Most measurements are accepted directly by the computer using its built-in analog inputs. However, Geotech has added an Applesoft language card, a printer controller, a real-time clock and an interface to some of the specialized laboratory instruments.

The computer runs 24 hours a day, seven days a week, as does the oil rig. Downtime can cost $3,000 an hour, so reliability is crucial. In the hostile environment of the off-shore rig, minicomputers have tended to die out. The line frequency may not always be 60 Hz, and line voltage can vary ±20V. The microcomputer, however, has resisted power problems.

Oil-rig monitoring by microcomputer is described by Phil Roybal in "An Apple in the Oil Fields: Computer Power Where You Need It." Roybal's article appears in the fall issue of *onComputing*, available in computer stores and selected newstands and bookshops and costs $2.50. The publication's offices are at 70 Main St., Peterborough, N.H. 03458.



Laboratory on rig contains an Apple II personal computer which monitors drilling data.

Show to Feature Communications

NEWTON, Mass. — Lake Systems Corp. (LSC) will hold its "Communications 80" Exhibition and Open House on Oct. 8-9, where it will showcase new products in audio, video and security systems.

Factory representatives will be there, along with the LSC staff, with information and hands-on demonstrations. Exhibitors include Hitachi, Adda, Sony Broadcast, JBL, Neotek, RCA and National Controls.

Admission to the open house is free to industry people. Further information is available from LSC at 55 Chapel St., Newton, Mass. 02160.

No

T-Shirt Maker 'First' to Link Minis by Satellite

BUTLER, Wis. — A personalized T-shirt manufacturer here said it is the first firm to link two IBM minicomputers via a Bell Telephone satellite communications link.

Holoubek Studios, Inc. has linked via SDLC Protocols an IBM System/32 with 13.9M bytes of main memory in its Wisconsin office to a 128K-byte System/34 located in the firm's London office.

"It's unique," said Ron Pierner, president of Computer Resources & Technology, Inc., a Milwaukee-based consulting firm that helped Holoubek develop the system. "It's the first time a small computer has talked with another small computer through a satellite."

Inventory Control

The $5 million Holoubek Studios uses its 120 employees to produce various types of customized T-shirts and uses the computer system to check inventory and send required shipments to the London office.

"They rely on us for everything," company President Verne Holoubek said, "[because] you really can't afford to ship it back."

The computer-satellite linkup allows the London office to send daily orders to the Wisconsin manufactuirng center. "When they give us the information, we know what to send them," Holoubek said, noting, sometimes before the satellite linkup the London office was sent products it couldn't sell.

If the London experiment, which costs about $12 a day, is successful, the firm will establish similar satellite links with offices in California and Hong Kong.

Pierner said IBM is watching the project with bated breath in hopes that, if successful, the idea can be marketed on a broader scale.

Holoubek, on the other hand, hoped the idea will increase his annual revenue by $1 million this year and to $20 million by 1985. He also said the satellite linkup will help him increase his export business from about 15% of total sales to around 50% by 1985.

Waiting.

We've successfully linked our cluster-based 8840 Word Processing System with our 600 Series DDP—and it's available right now!

So what are you waiting for?

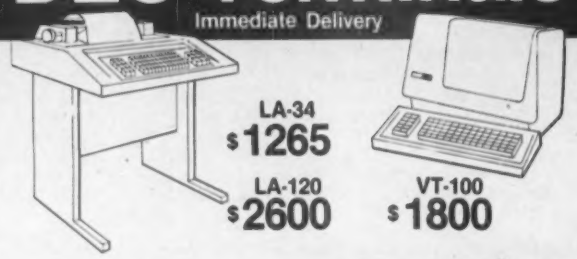
Nixdorf Computer Corporation, 300 Third Avenue, Waltham, Massachusetts 02154. Call the Link operator at (617) 890-3600 or your local Nixdorf sales office.

NIXDORF COMPUTER

INFO '80 Booth 2201

NEW Low-cost DEC Terminals

Immediate Delivery



LA-34 $1265

LA-120 $2600

VT-100 $1800

To order call:
WATS 800-527-7700
Local 214-659-3800

vardon & associates, inc.
1401 Walnut Hill Lane • Irving, Texas 75062

Airport-Based POS Units Cater to Duty-Free Shoppers

By Deborah Wise
CW Staff

LOS ANGELES — As the number of international travelers increases, so does the demand for duty-free merchandise. Communications technology has been introduced to cope with the former growth and now technology can help satisfy the latter, too.

With a network that links shops to the warehouse and keeps track of flight times and inventory levels, both passengers and merchandisers can do more business more efficiently.

Host International, Inc. has nine duty-free shops at Los Angeles Airport and one downtown store here. It used to use an electromechanical device to process orders. Sales personnel wrote tickets using an electrosensitive pen that simultaneously reproduced the order over low-voltage telephone lines.

Problems of legiblity led to mistakes in deliveries to the airport, and the increased volume of business led to delays. All transactions had to be summarized independently for sales and stock-level information, and U.S. Customs reports had to be batch-processed by an outside bureau.

To keep competitive, a system had to be devised to speed up the process and make it consistently efficient.

By installing a computer and 50 point-of-sale (POS) terminals, Host can now process more sales faster, create management reports and keep up-to-date with U.S. Customs requirements as well as create benefits for sales staff who can concentrate on selling rather than processing orders, according to Stephen Izant, director of administration for Host's merchandise operation.

Initial Problems

But initial problems with high-cost telephone communications between the airport and the downtown outlet had to be solved.

Host installed an HP-3000 Series 3 system with 1M bytes main memory and 33 telephone lines for the airport stores and 23 lines for the downtown location. Since the CPU was at the airport, only the cost of leasing the downtown lines proved great. At $75 a line per month, Host felt it necessary to seek an alternative method.

Moxon Electronics, an Anaheim, Calif.-based company specializing in solving data communications problems, came up with a solution that condensed the number of telephone lines from 23 to two using two sets of Micom Systems, Inc. concentrators and Racal-Vadic, Inc. modems for 18 POS terminals.

Although the initial expense for the equipment was more than the cost of the leased lines, "we envision a savings over the life of the lease — say 6 years — of about $50,000," Izant said.

Los Angeles Airport is expanding with a new terminal due for completion in two to three years, and Host will then upgrade its system which now includes HP 3075 POS terminals, HP 2624B CRT terminals and HP 2631 printers.

If Churchill had used SPSS®, he might have saved his statistical department a lot of blood, sweat and tears



In waging war . . . and business . . . great executives know that good data analysis is a matter of life and death. Winston Churchill knew it:

"One of the first steps I took on taking charge of the Admiralty . . . was to form a Statistical Department of my own—(one that I) could trust to pay no attention to anything but realities. This group was able to present me continually with tables and diagrams illustrating the whole war. I (therefore) had from the beginning my own sure, steady source of information, every part of which was integrally related to all the rest." (*The Gathering Storm*—pp467-68)

Thanks to the honest and tireless efforts of his Department, most of the war's critical decisions were based on facts, not hunches. Had they been able to use the SPSS Data Analysis Package, the Department's analysts could have explored the legions of data more quickly, efficiently, creatively . . . with easy-to-generate tables, graphs and reports, as well as sophisticated statistical analysis.

Using the SPSS Graphics Option, Churchill might have had graphs showing The Battle of Britain in terms of German and British aircraft losses by time. Using regression analysis, Churchill would have had an excellent estimate of future losses.

As a matter of fact, Churchill might have been able to do it on his own, without the Department, because SPSS is so easy to use. Churchill himself could have learned from the excellent SPSS self-teaching manual. No special training in computer language would have been necessary—SPSS talks, listens and reports in the user's language: plain English!

When you decide which data analysis software package is right for *your* life and death decisions, consider the facts, as Churchill would have done. SPSS is sophisticated in output, yet simple to input. It's extremely portable—works in almost all computer environments. And you needn't hire any extra data processing people—your data researchers work on their own . . . with considerably less "blood, tears, toil and sweat."

If you would like to see how SPSS-generated graphs and charts would have displayed The Battle of Britain to Churchill, or for more information on SPSS, call or write:

Roger Sack
SPSS, Inc.
Suite 3300 **Dept CW10-80**
444 N. Michigan Avenue
Chicago, IL 60611
312-329-2400

SPSS inc.

DATA ANALYSIS
MADE SIMPLE

SPSS runs on: IBM 360, 370, 4300, OS, DOS, CMS and all IBM compatibles / Burroughs Medium and Large Systems / CDC CYBER & 6000 Series / Data General Eclipse & Nova / DEC Systems 10, 20, VAX, PDP-11 / HARRIS 4, 7 / HEWLETT-PACKARD 3000 / Honeywell 60 / ICL2900 Series / Perkin-Elmer / Prime 400-750 / Siemens BS 2000 / Univac 70, 90, 1100 / Other SPSS Conversions are available. Contact SPSS, Inc. for more information.

Kansas DPMA Plans Fall Meets

SHAWNEE MISSION, Kan. — The Data Processing Management Association (DPMA) in Kansas City has announced its fall series of executive and management seminars to be conducted here.

Cosponsored by Univac, all programs will be workshop in format and will include film studies of sample problems. The first in the series is "The Effective Executive," which will run Tuesday and Thursday afternoons from 4:30 p.m. to 6 p.m. The $50 fee includes all texts and course materials.

Further details and course reservations can be obtained from Leo Hertz at Univac, Suite 200A, 4210 Johnson Drive, Shawnee Mission, Kan. 66205.

IBM-compatible computers explained–by the leader in IBM-compatible computers.

In these times of recession, inflation, and high interest rates, it's important to get the most for your money when expanding your computer installation. Especially when you're under pressure to increase productivity within your current budget limitations.

At National Advanced Systems, we offer the industry's broadest range of inflation-fighting IBM-compatible computers. In fact, we have the largest installed base in the entire industry. That's why it makes sense to consider a compatible computer from the leader in the field.

The IBM-compatible industry is here to stay.

To understand the compatible computer industry requires an appreciation of the commitment users have made to software designed to run on IBM mainframes. When you realize that over $300 billion worldwide has been spent on IBM software and training, it's obvious that a hardware revolution resulting in the incompatibility of existing software will never happen.

This fact has allowed manufacturers such as ourselves to provide superior price/performance alternatives to IBM users. As a result, the IBM-compatible segment is now growing twice as fast as the rest of the data processing industry. In fact, last year was a record growth year for the compatible industry, outpacing even IBM.

Compatible computers are here to stay. And National Advanced Systems will remain in the forefront – because we understand your need to increase productivity while protecting your investment.

We offer a full line for your consideration.

Our Advanced Systems product family is backed by a $1 billion multinational corporation, offers unequaled price/performance, and boasts higher residual values over time than even IBM. Our family ranges in size from our medium-scale AS/3000 to our AS/7000 DPC which outperforms the IBM 3033. And each system is backed by the finest service and support in the industry.

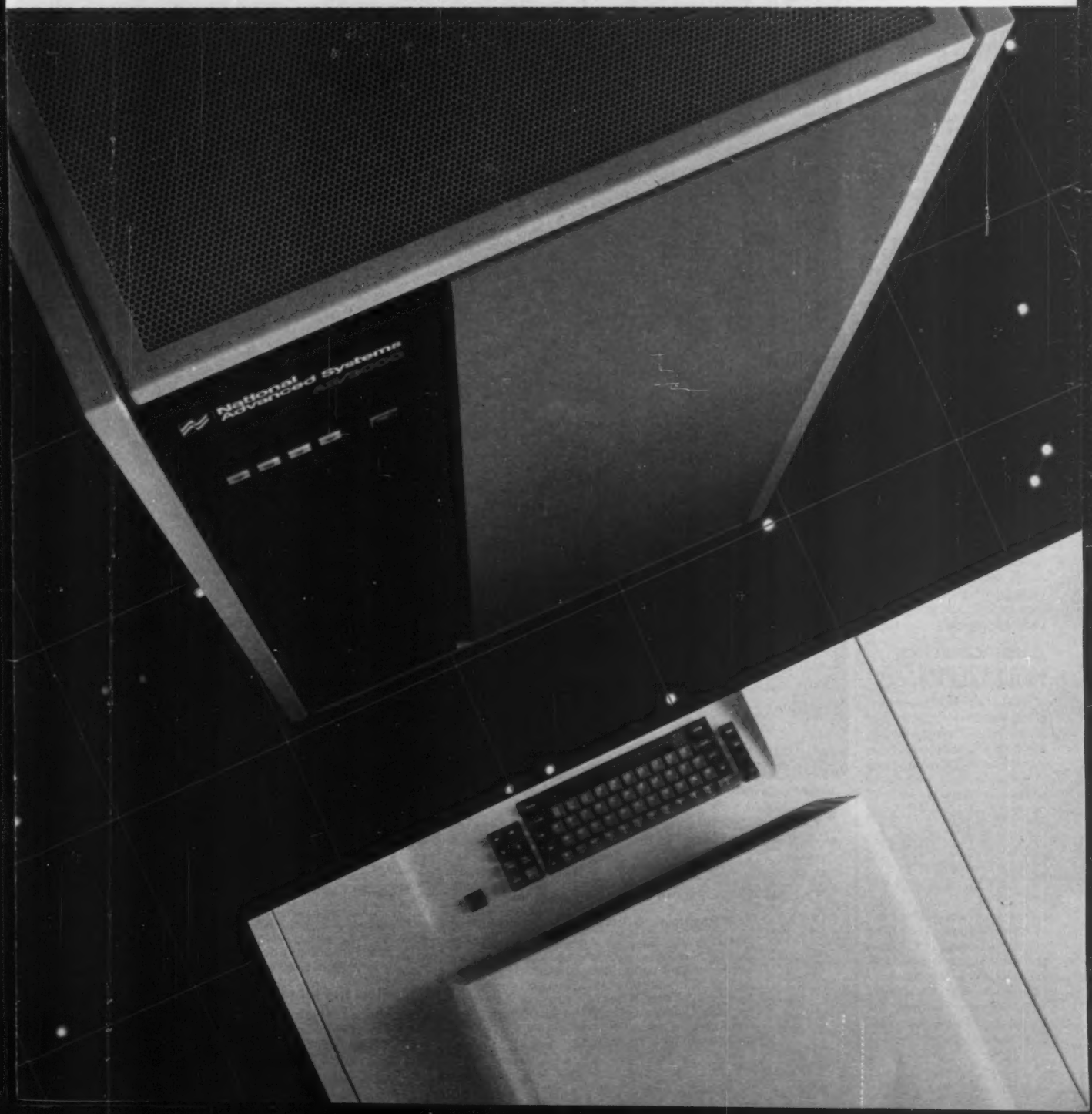
For more information, contact your local National Advanced Systems sales office, or contact Marketing Dept. A1, 3145 Porter Drive, Palo Alto, CA 94304, 415/856-5000.

National Advanced Systems. In economic times like these, it's nice to know there's a company compatible with today's budget realities.

National Advanced Systems

The Compatible Computer Company

A subsidiary of National Semiconductor



On Oct. 24
Boston to Host Legal Conference

BOSTON — The Northeast Computer Law Institute, a conference aimed at attorneys in and out of the information processing industry, will be held here Oct. 24.

Sponsored by the Massachusetts Continuing Legal Education — New England Law Institute, Inc. (MCLE-NELI), the program is designed to provide lawyers with an up-to-date perspective on legal problems likely to be encountered in the acquisition and use of computer systems.

Moderated by Peter Marx, secretary and general counsel at Interactive Data Corp. of Waltham, Mass., the one-day seminar will feature such speaker/lawyers as Thomas Christo on "Litigation"; Jerry Cohen and Thomas Franklin on "Legal Protection of Computer Programs and Computerized Data Bases"; and Robert Bigelow on "Government Regulation."

Registration fees are $75 for lawyers admitted to the bar before July 1, 1977; $60 for Boston or Massachusetts Bar members; and $55 for MCLE-NELI members. For those admitted after that date, fees are $50; $40 for Boston or Massachusetts Bar members; and $35 for MCLE-NELI members.

More information is available from MCLE-NELI at 133 Federal St., Boston, Mass. 02110.

Eggert Receives Federal Honor As Top Employee

CHICAGO — George R. Eggert, director of the Office of Planning and Management for the Defense Contract Administration Services Region, Chicago, has been named the Outstanding Supervisory Employee of the Year by the Federal Executive Board in the 23rd annual Federal Employee of the Year awards program.

Eggert was honored at a recent luncheon ceremony. Long active in the field of information privacy, computer crime and ethics, he has served on the advisory council of the Information Privacy Research Center at Purdue University, and is a member of the editorial boad of *Information Privacy* magazine.

He is also a former president of the Data Processing Management Association and is an active member of the Executive Board of the American Federation of Information Processors.

Currently heading up an office that serves Wisconsin, Indiana and northern Illinois, Eggert dispenses management services on approximately 18,500 contracts.

Audiocassettes Hold Lita Papers

CHICAGO — The papers presented at the Library and Information Technology Association's (Lita) institutes on "Automated Acquisitions Systems" are now available on audiocassettes.

The titles of the cassettes include "The Functions of Acquisitions"; "Local Systems — Design and Costs" and "Vendor Systems — On-Line Ordering."

Recordings are unedited and sell for $4.25 each. The full set of nine is priced at $35. Lita members and institute registrants receive a 10% discount.

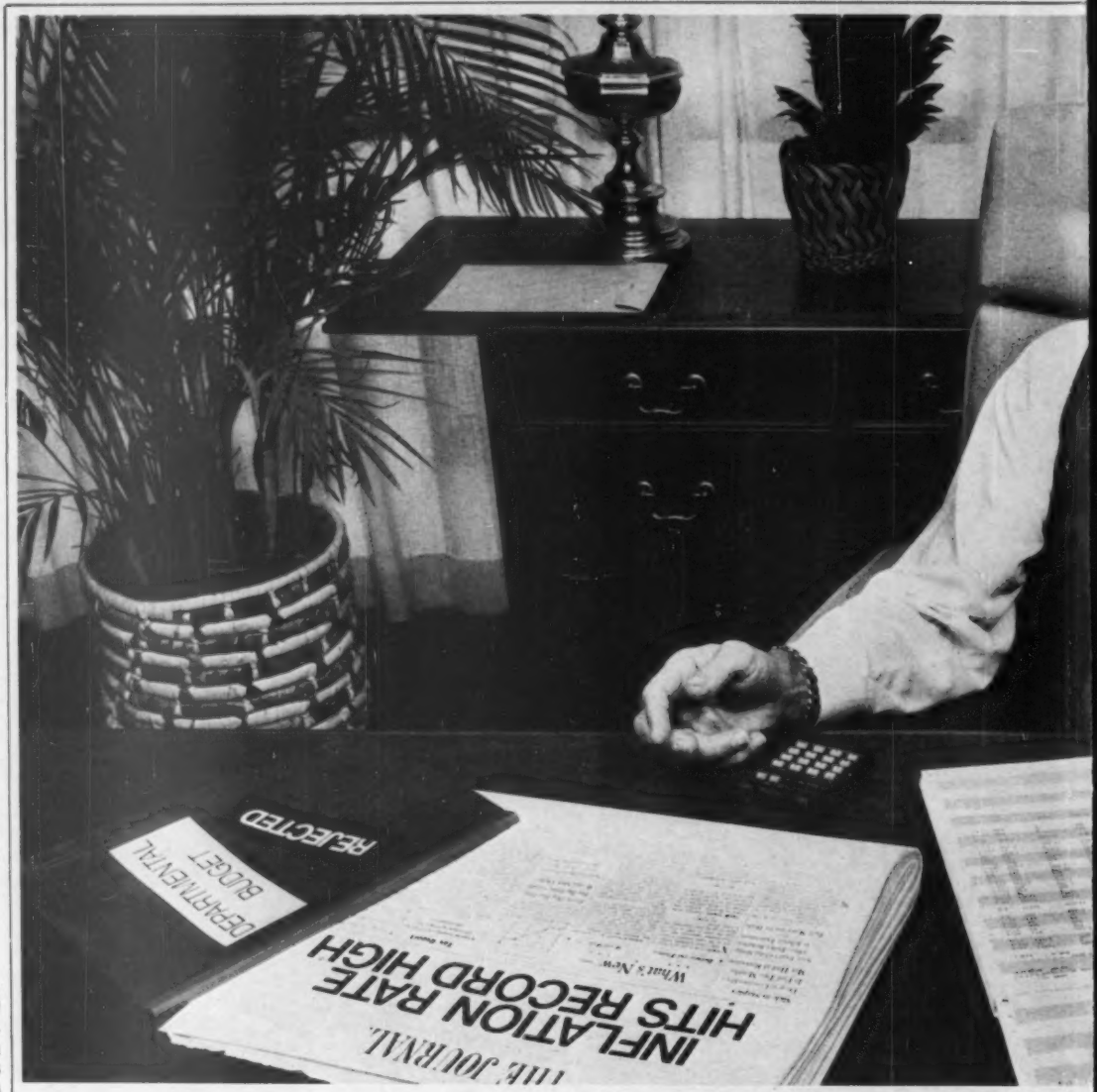
Cassettes may be ordered from Information Yield, 311 Stonecrest Drive, Syracuse, N.Y. 13214.

Datatraining '80 Set for Dec. 7-10

CAMBRIDGE, Mass. — *Northeast Training News* will sponsor the Datatraining '80 conference Dec. 7-10 here. Sessions include cost justification of DP training; making new programmers productive quickly; computer-based instruction; and future trends of educational measurement and instruction.

The keynote speakers are Richard Nolan, chairman of Nolan, Norton & Co.; Joseph Ferreira, vice-president of the Diebold Group; and Dr. Chip Bell of Lead Associates.

Registration costs $300 before Nov. 14 and $340 after that. *Northeast Training News* is at 176 Federal St., Boston, Mass. 02110.



Is your data line hurting your bottom line?

Budget cutbacks, inflationary spiral, recessionary trends ... the new data communication buzzwords of the 80's and you're stuck right in the middle of it.

The Problem: Growing Operating Costs

How do you keep your company's data network up and running when the cost of everything is going out of sight ... higher tariffs, utility bills, and labor costs are all cutting right into your budget. High speed data communications should reduce your company's operating costs. But finding a responsive supplier who can design, build and deliver an economical data communications system can be a trying task.

The Solution: Racal-Milgo's Inflation Fighter Data Communications Program

Racal-Milgo, the world leader in data communications systems, is introducing a program that can not only save you money, but will give you an opportunity to try top-of-the-line 4800 bps modems with an offer that can improve your bottom line.

How to Fight Inflation at 4800 bps

Under our inflation fighter program, you get the first 60 days free when you lease our MPS 48 modems. And there's no charge for either installation or maintenance.*

Mini Cuts Supplier's Paper Overload, Ups Sales

HOUSTON — Volumes of paper work threatened a business supplies company's efficiency in handling orders, but the introduction of a minicomputer cut the overload and helped increase sales.

Five years ago when Russell K. Brown, now administrative vice-president, joined Moore Paper Companies, Inc. here, he saw the need for automation but "waited until the new minis had come onto the market and had been tested."

Brown chose a Wang Laboratories, Inc. system over other makes for cost-effectiveness, its ability to fulfill the company's requirements of a data base programmable in Cobol, its real-time capability and its immediate availability, he said.

A comparable IBM system today — the System/3 series for example, or the 4331, 4341 or 370/138 — would cost 40% more, and there are lengthy delays on delivery, according to Brown.

Schedules 3,500 Orders

Moore installed a Wang VS with two 75M-byte disk drives a year and a half ago. The system handles pricing, invoicing and orders. It allows for immediate information retrieval and status reports on the production schedules of 3,500 orders.

The VS system has had only four hours mainframe or disk drive downtime during the 18 months it has been installed, according to Brown, who praised the support services of Wang in restoring the power when this occurred.

Brown said the machine's only limitation is in actual memory size. When new jobs are introduced in the future the system will spend more time accessing file information, thereby lessening on-line response time.

An upgrade is planned within a year that would add 10 workstations to the 14 already in use.



"When an order is called in to our City Sales Department," said Russell Brown, vice-president, "the person handling it can simply move in front of the screen, push a button and obtain data on any of 2,000 inventory items."

Brown also wants to install Wang phototypesetters and word processing units and sees future communications possibilities with Moore's two branch offices located in Texas.

The software for the system is provided by a local firm, Delphi Data Systems, Inc. and Moore employs two full-time computer room personnel.

Company sales have increased 33% per year over a five-year period and Brown foresees automating more parts of the business with the new workstations.

Plans for the future include using four of the new workstations to automate the companies paper container business, with the remainder of the machines being used for budgeting and job costing applications.

The phototypesetters will be used to expedite forms manufacturing. "The data for standard items such as an invoice, purchase order or bill of lading will be retained on magnetic media," Brown said.

"For future orders, our composition group will be able to bring the design out of storage and fine-tune it at a workstation to suit the customer's specific needs.

At the moment, the minicomputer saves the company time on routine tasks. "When we took our fiscal-year inventory, after entering counts into the system, we were able to hit a button, lean back and drink a Coke while the computer added and extended the inventory and generated the report," Brown said.

Moore's present system, including workstations, disk drives and printers, would cost approximately $115,000. Each additional workstation, at today's prices, costs $3,000.



The way we see it, once you have an opportunity to operate our cost-efficient modems, you'll be interested in exploring our complete line of data communications systems, all designed to increase efficiency and save you money!

We've prepared a very interesting new package to explain this exciting program on how our top-of-the-line modems can improve your bottom line. Send for it now.

Racal-Milgo

Racal-Milgo Information Systems, Inc.
8600 N.W. 41st Street Miami, Florida 33166
Telephone (305)592-8600 TWX: 810-848-6588 RACAL The Electronics Group

*Offer expires October 31, 1980 and is subject to certain restrictions.

Send me more information on Racal Milgo's Inflation Fighter Data Communications Program



Name

Company

Address

City State

Zip Phone

CW 10/6/80

Land Base System Pinpoints City's Problems

HARTFORD, Conn. — A Land Base Planning Information System (LBPIS) using information from city department files and organized by property addresses is helping this city serve residents better by pinpointing problems by neighborhood.

"For example, we used LBPIS in 1979 to determine by neighborhood how many city residents would have problems paying their heating bills," Anthony N. Yaeger, the city's DP manager, explained.

"Because of overlapping information from the city assessor, police, registrar of voter's data and social service departments, very accurate projections were made. With detailed reports in hand, we made a request to the state government for aid. We believe some 30,000 city residents had heat they might otherwise not have been able to afford," he said.

LBPIS has also been very effective in other areas, including police work, Yaeger said. "Using information provided by police applications, we have pin-pointed neighborhoods plagued by particular crimes.

"We have been able to determine, for example, areas where purse snatchers and car thieves tend to operate most, and police have instituted crime reducing programs for those particular areas; and just as important, we can then use information from other data sets to develop a neighborhood profile that can address not only the crime but why the crime probably takes place," he said.

Files from the city assessor's office were used as a base for LBPIS because the entire city is geographically defined in his office, he added.

The system is also used to administer Comprehensive Employment Training Act (Ceta) programs, funded by the Department of Labor, for 22 neighboring cities with program budgets totaling $24 million.

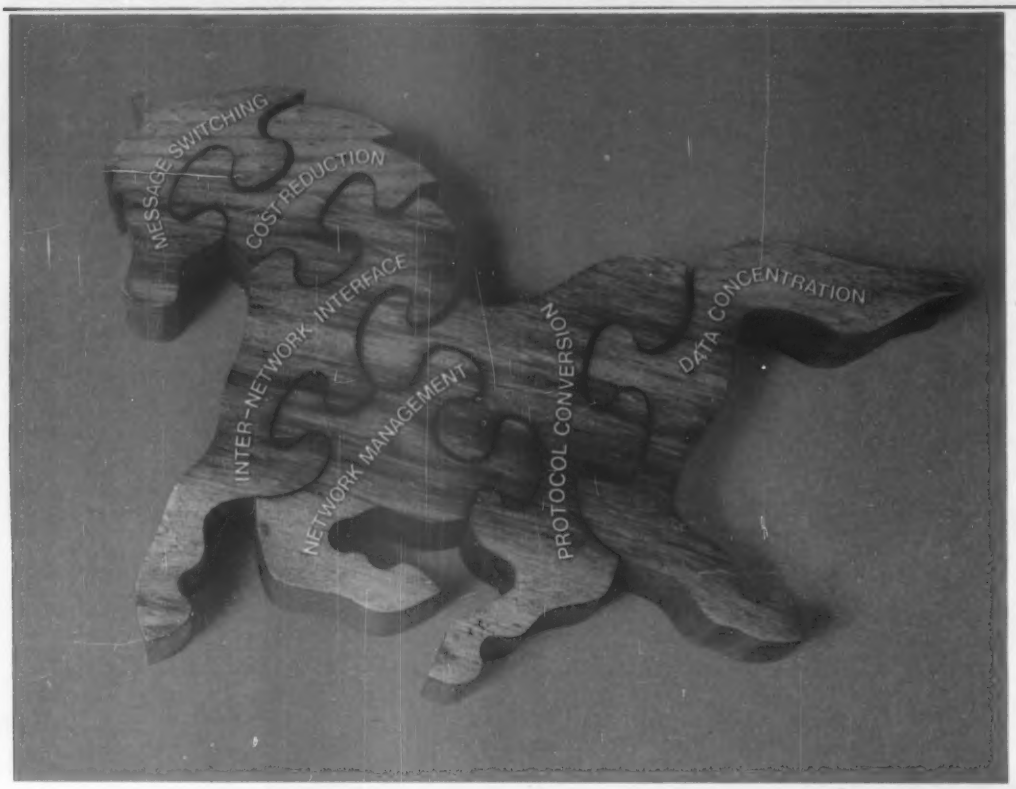
The city's Ceta work includes tracking over 10,000 clients from first interviews, through training, to job placement, Yaeger said. The system also handles all Ceta payrolls in 22 surrounding cities while managing the financial activities of each program.

In addition, it supports applications that both save the city money and generate revenues. One is a Lost Time Statistics application that interfaces with payroll activities to determine, by department, how many and which employees frequently miss work.

Using information from voter registration files, it creates voter lists arranged by age, location, political affiliation and other selected topics. The lists are sold to politicians and public interest groups so they can reach specific segments of the population. "This program generates quite a bit of revenue for the city, and it generates it from an area that would otherwise go untapped," Yaeger said.

Future plans call for bringing more city departments into the LBPIS program to broaden the information base for the city planners. This will allow city administrators to determine population changes within the city so they can better plan the city's future.

The software runs on a 3M-byte Burroughs B6800 linked to 1.5G bytes of removable disk pack storage, 56 Burroughs TD 830 display terminals in 12 city departments and three line printers.



How to get your data communication networks back together and up and running for under $30,000

Do you spend too much time and money trying to patch together incompatible networks and terminals? Have past network and protocol decisions created roadblocks to your efforts to accommodate new user needs? ■ If so, call in the ICOT Communications specialists. ICOT is experienced in making all the pieces work together. ■ ICOT has been a major supplier of data communications products to our Nation's airline industry since 1972. ICOT provides 24 hour/7 day nationwide parts and service coverage to protect your network. The ICOT team represents experience, reliability and service. ■ Find out more about our network problem solving capabilities by returning the coupon—or call 800/227-8068 (In Calif: 800/982-5823). Ask for Ron Rowe. ■ Take the first step toward solving your problem today!

ICOT
PRODUCTS FROM MICROFORM

MICROFORM DATA SYSTEMS, INC. attn. Ron Rowe
830 Maude Avenue, Mountain View, CA 94043

☐ Have your representative call us. ☐ Send me more information.

NAME/TITLE
COMPANY
ADDRESS
CITY/STATE & ZIP PHONE

Course Set On Writing

LOWELL, Mass. — "Effective Written Communication" is an intensive two-day course that will be offered at the University of Lowell on Nov. 19-20. The program will be conducted by Louis J. Visco, communications consultant at Arthur D. Little, Inc.

Intended for newcomers to the corporate world, the program outlines new techniques for the presentation and interpretation of statistical and other complex data.

Included in the enrollment fee of $275 are all materials, lunches and refreshments. Discounts are available for multiple enrollments. Registration is being handled by Michelle Fournier, University of Lowell Continuing Education, Lowell, Mass. 01854.

Commonweal or Common Criminals?

Henry VIII's Justices on the Take? CPU Checks

CLAREMONT, Calif. — Were 15th century justices of the peace in England true spokesmen of the people or were they a bunch of local politicians on the take? And after almost 500 years, can one arrive at the truth today?

Dr. Robert L. Woods Jr., history professor at Pomona College here, expects to find out with the help of a 20th century tool — the college's mainframe.

After almost seven years of research, much of it among England's centuries-old archives, Woods has amassed some 100,000 records on 2,800 justices of the peace who served between the years 1485 and 1537. The names of these individuals popped up over 34,000 times in the archives, and Woods expected these figures to double before he completes his work, which is in the final stages.

Early Renaissance Period

Among the first social scientists to recognize the power of the computer as a research tool, Woods described his study as an attempt to reveal the past and the human condition in England's early Renaissance period. He felt not enough work has been done in this important area of transition.

"Justices of the peace represented a central institution of law and politics," he explained, adding that his study "should shed light on modern ideas of political bodies and also contribute to an understanding of how modern democracy and the law evolved."

Already Woods sees some indication that the justices — widely held as natural leaders of the people and early spokesmen for democracy — may have been bought off by the Tudor monarchy.

The period being studied followed 100 years of war, a time when the king and his court wanted stability and peace and were willing to pay the price through a system of what may have been "one hand washing the other."

Hunting Indicators

The computer, an IBM 4331, helped Woods focus on individual justices and reconstruction of their records over two decades. The idea is to flush out the indicators that suggest shifts in the justice's income or property holdings.

It is similar to the skepticism one might feel today when a newly elected politician suddenly shifts his life-style from an economy car and a modest home in town to a limousine and a mansion in the country.

Advanced computer programming made possible the storage interconnection of the massive number of records. This technology permitted the researcher to address the computer in English language statements and immediately get answers that otherwise involved tedious and lengthy efforts.

The sheer volume of these records, manipulation of them and the many cross references would have discouraged many scholars from undertaking the task.

Typical Questions

Here are some questions Woods posed in his research: Who received royal commissions to be justices of the peace? During what dates? With what powers? What were the educational and social prerequisites? Were justices selected based on their landed wealth or liquid wealth? How did Henry VIII's government recognize a qualified justice? Did the real power of the justices derive from their social influence or from the king's authority?

Citing the advantage of the computer, Woods said, "You can reach into the middle of a record to get at information. You can see relationships between records, as for example, the existence of a marriage, which further helps to identify a particular justice of the peace."

Also the computer can automatically correct calendar differences. The Regnal calendar, for example, expressed years in terms of the king's reign. Such references are more meaningful when expressed in today's Gregorian calendar.

Another major research hurdle involved the carelessness in spelling of names. The same Smith might appear in archives as Smyth, Smithe, Smeth or Smethe.

Using an IBM CRT terminal with a keyboard, Woods could display from computer records all the various spellings along with further identifiers.

"Only the unique characteristics of one man can separate or link those of similar spelling, such as a daughter named Mary or a wife named Anne," Woods explained.

"The new technology let me display the data and rapidly modify it to get at the true situation," he said.

Instead of a service call, maybe all you need is a conductive floor mat



You've seen it happen — word processing and other electronic equipment suddenly acting up for no apparent reason. One possible reason for a good percentage of your unexplained equipment malfunctions — static.

Electrostatic discharge can damage delicate electronic circuits and cause loss of data and alteration of memory in computers and electronic office equipment — all of which can mean expensive service calls and even more expensive equipment down time.

It takes as little as 500 volts; so little that you might not even feel the spark. Yet you can generate over 12,000 volts of static charge just walking across a carpet. Even on a vinyl floor, 4000 volts is not uncommon.



3M Brand Static Control Floor Mats can create an inexpensive "island of protection" around delicate electronic office equipment, harmlessly draining static charge from operators and other personnel.

A 3M Brand Static Control Floor Mat can cost as little as a single static-caused service call. If it helps you avoid a single call, it can pay for itself.

Static Control Floor Mats come in hard mats for easy movement of castered chairs, and soft mats for comfortable standing.

For information about how you can purchase 3M Static Control Floor Mats, call toll free

1-800-328-1300
(In Minnesota, call collect 612-736-9625.)

Ask for the Data Recording Products Division

3M

"Have your orders keyed remotely."



The P-15 Data Concentrator permits your customers to remotely key their own orders for your products. It will simultaneously answer up to eight calls and provide immediate storage on computer diskettes. Your customers may key their orders on a hand held terminal or simply use their push button dial telephone. Call or write for complete information.

PHONE 1 1011 River Lane • Loves Park, Illinois 61111 • 815/877-9008

ALANTHUS IS RISING!

Alanthus T-320 & T-1220. The new stars.

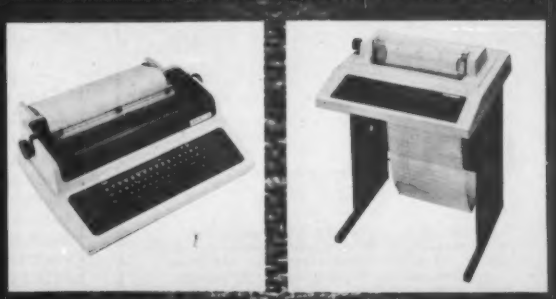
The Alanthus T-320 is a 300 Baud Table Top Printer with compressed Font and 45 CPS "Catch-up" capability . . . to help keep you ahead of the competition.

The Alanthus T-1220 is the most sought after Printer on the market today. No wonder, at 1200 Baud, Bi-directional and Smart Printing, and speeds up to 180 CPS.

We saw the need and we rose to meet the challenge. That's why we're called Alanthus. Catch one of our stars today.

alanthus data communications

Alanthus Data Communications Corporation
6011 Executive Boulevard, Rockville, Maryland 20852
Telephone: 301-770-1150 TWX: 710-828-0086



Saving 10 Cents Per Barrel

Minis to Supervise U.S. Deepwater Oil Port

Special to CW

NEW ORLEANS — A network of minicomputers will perform the supervisory functions for the first deepwater oil port in the U.S., scheduled to operate off the coast here sometime next year.

Controlled by minicomputers, the Louisiana Offshore Oil Port (Loop) will allow the unloading of oil-carrying supertankers more than 18 miles offshore.

The port will be capable of offloading oil at rates up to 100,000 barrels per hour at a cost savings of about 10 cents per barrel.

The oil will then be pumped along 44 miles of pipeline to underground storage cavities at the Clovelly Salt Domes, a spokesman said.

The master controls for Loop's Supervisory Control and Monitoring (Scam) system are at the port's operation center in Galliano — three miles from the salt dome storage area.

At the heart of the operations center are two Data General Corp. Eclipse M/600 minicomputers with 640K bytes of memory.

The computers share a 10M-byte dual-ported storage disk and are supported by a model 4218 300 line/min line printer and dual Model 6067 50M-byte storage disks.

Dual Eclipse S/130 minicomputers will be used at each of the system's three remote computer locations: The platform complex, a booster station onshore and the Clovelly Dome Storage Terminal.

The remote computers are called facility control processors (FCP). A separate, single Eclipse S/130 minicomputer will be used for scheduling and system monitoring at the port's New Orleans headquarters.

Five Functions

The computers provide five basic functions: (1) high levels of automation for minimum manpower requirements, (2) system operation from one location, (3) leak detection, (4) use of distributed processing to minimize the length of critical control loops and (5) a high-level of operational data acquisition for maintenance, scheduling and accounting.

Briefly, here is what will happen to the oil in the Loop system. At the unloading complex 18.5 miles offshore, a supertanker will hook up to one of the three single anchor leg mooring (Salm) buoys.

Two flexible, floating hoses, each about 1,050 feet long, will carry the oil from ship's cargo manifold to a fluid swivel unit at the base of the Salm.

From the Salm's base, the oil enters an underwater pipeline. This pipeline extends 8,000 feet from the buoy's base to the Loop pumping platform complex.

When the oil reaches the platform, it will be boosted to shore by three pumps connected in parallel, driven by three 7,000-horsepower electric motors. This pumping system will move the oil at rates up to 100,000 barrels per hour through a 48-in. diameter pipeline.

When the oil reaches Loop's Fourchon Booster Station, four 6,000-horsepower pumps will pump the oil through a buried 48-in. diameter pipeline to the Clovelly Salt Dome Storage Terminal.

Eight Cavities

Eight cavities at the salt dome, each with a storage capacity of four million barrels, will house the incoming crude. Since Loop will be handling an estimated six different segregations of crude from abroad, the individual cavity system is essential.

Oil from the various cavities will be pumped in and out on an almost daily basis, just as is done with a traditional above-ground tank farm at a refinery.

Installation of the computerized supervisory control system is being managed by Control Applications, Inc. (CAI) of Houston.

Because the successful operation of the Loop requires that all the minicomputers act almost in unison, the system will have a communications capability. Three microwave communication circuits operating at 1,200 bit/sec will link each FCP.

Each main computer in the Loop complex talks to its backup through a DG Multiprocessor Communications Adapter (MCA). The MCA transfers data blocks from one computer to another through their direct memory access channel, permitting concurrent data transfers between computers at rates up to 1M byte/sec.

In addition, each S/130 computer has a data control unit (DCU/50), which provides a high-performance data channel interface to the M/600s and field data interfaces.

The DCU/50 supports synchronous and asynchronous line multiplexers by performing all character-level operations while providing a data channel path to the computer.

The unit controls multiplexer operations in parallel with noncommunications activities, significantly reducing computer overhead. Handling of character type data by the M/600 computers is facilitated by the high-speed Input/-Output Processor (IOP).

About 70 programmable Gould, Inc. Modicon controllers are used to interface between the computers and the actual hardware such as pumps, valves and turbine engines, the spokesman added.

Each remote computer system is hardwired to all programmable controllers located at that particular site. Operating independently of the computer, the programmable controllers collect operational data, execute programmed sequence logic and perform other local control functions.

When the oil reaches the Fourchon Booster Station, it comes under the control of two more Eclipse S/130s.

Through the programmable controllers, the S/130 computer manages the four 6,000-horsepower electric motor-driven booster pumps. The computer also manages the 4-in. diesel pipeline which supplies diesel fuel to the turbine-generator sets on the offshore pumping platform.

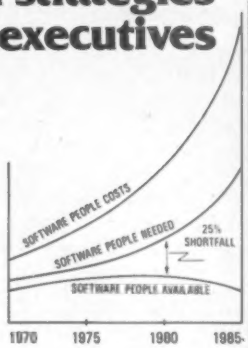
A dual set of Eclipse S/130 computers also controls the injection and delivery of the oil into the cavities at the Clovelly Salt Dome Storage Terminal.

All of the computers run under DG's Real-Time Disk Operating System (Rdos) except the two M/600 computers at the Operation's Center and the S/130 computer in New Orleans, which runs under DG Advanced Operating System (AOS).

The oil companies participating in Loop's ownership are Ashland Oil, Inc., Marathon Pipe Line Co., Murphy Oil Corp., Shell Oil Co. and Texaco, Inc.

Survival strategies for EDP executives

Your major problem for the next five years: **Software people productivity**



We have just finished an extensive multiclient study of software productivity improvement.

Study results are now available for $30,000, which includes consultation with our staff so you can apply the results to your EDP organization.

Included in the study are:

- How to measure productivity.
- How to provide an environment that makes your people more productive.
- How short-term gains contribute to long-term goals.
- How to design productivity improvement strategies for maximum payoff.
- Which productivity improvement aids work and which don't.

If your top floor wants more and better MIS, you can easily cost-justify sharing what we've learned from six months of research covering more than 500 organizations.

You'll want to find out more. Call Leo Feltz in our New York office, (201) 368-9471, or George Hunter at our Palo Alto headquarters (415) 493-1600. Or write INPUT: PRODUCTIVITY, 2471 East Bayshore Road, Suite 600-D, Palo Alto, CA 94303.

INPUT Planning Services for Management

With a staff of nearly 100 people operating from eight offices worldwide, INPUT provides planning information, analysis and recommendations to both user and vendor management in the information processing industry.

FSO/CICS

Full Screen Output For the CICS User

– *SPOOLED INPUT/OUTPUT REVIEW*
Scroll, Search for a character string, Page, Set reference points, Delete, Requeue or Print.

– *STATUS COMMANDS*
Display active jobs, Jobnames on queues, Detailed information about active Jobs or Partitions.

– *DATA SET UTILITIES*
Perform IBM IEHPROGM facilities on line.

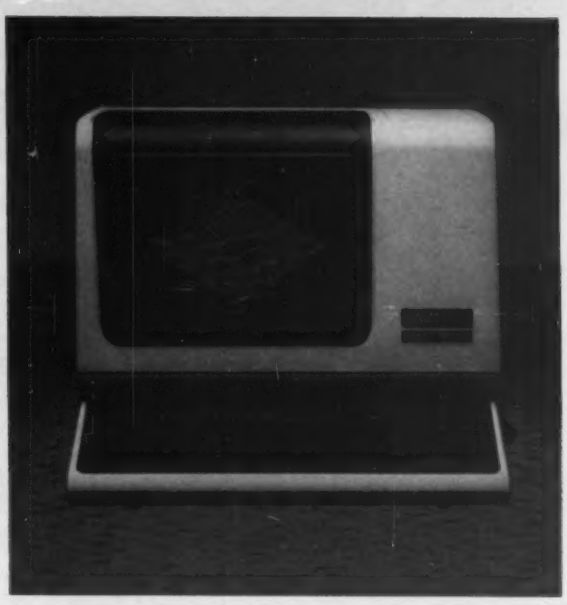
– *ALTER/DISPLAY FUNCTIONS*
Display or alter virtual storage, Display TCB's, UCB's, Locate modules in LPA or JPAQ and resident SVC's, Express CANCEL a TCB.

TONE SoftwareCorp

Call or Write for Details

1124 N. GILBERT
ANAHEIM, CA 92801
(714) 991-9460
TELEX 181-592

The Digital VT100 Is Now A Graphical VT100.



That's right. What many professionals consider to be the best alphanumerics terminal around, the VT100,™ is better. A whole lot better.

The reason? Retro-Graphics.™ A breakthrough that transforms the VT100 into a high-performance graphics display terminal. With multiple character sizes. Dot-dash lines. Point plotting and vector drawing. Selective erase for quick, easy updating of the graphics display. In short, complete emulation of Tektronix® 4010 Series terminals. Which means complete compatibility with most existing graphics software, including Tektronix Plot 10™ and ISSCO's DISSPLA® and TELLAGRAF.®

Retro-Graphics VT100 graphics are all displayed on the 12" (diagonal) green-toned screen at 640 x 480 resolution. And refresh raster scan technology results in a bright, easy-to-read display even in high ambient light environments.

Retro-Graphics. Added Value From Digital Engineering.

Not Digital Equipment, mind you. Digital Engineering. A somewhat smaller but very bright group who are pioneers in retro-fit graphics. Adding value is nothing new for them. Just ask any of the thousands of Lear Siegler ADM-3A and 3A+ owners whose Dumb Terminals® became graphics powerhouses thanks to Retro-Graphics.

Of course, a great idea like Retro-Graphics always starts with a good one. And the VT100—featuring 96 upper/lower case ASCII characters, up to 132 characters per line, numeric and function keypad, detachable keyboard and a wide variety of screen customizing features—is a very good idea, indeed.

Together, they become one exceptional idea called the Retro-Graphics VT100. The perfect graphics addition for business, scientific and engineering design applications, regardless of whether you want to maintain DEC product continuity or are just looking for the highest quality graphics terminal at a cost hundreds less than the competition.

A Good Idea Is Where You Find It. And When.

Where you'll find the Retro-Graphics VT100, up and running, is at Info '80, New York Coliseum, New York City, October 6-9. Look for it at National Computer Communications' Booth #2132. Beginning in November, the Retro-Graphics VT100 will be sold through NCC as well as by selected other Digital Engineering distributors.

For more information on how and where to order, call or write Digital Engineering directly. As for when to order, we suggest immediately.

DIGITAL ENGINEERING
630 Bercut Drive
Sacramento, CA 95814
(916) 920-5600
TWX: 910 367-2009

NATIONAL COMPUTER Communications Corp.
260 West Avenue
Stamford, CT 06902
(203) 357-0004

VT100™ is a trademark of Digital Equipment Corporation. Retro-Graphics™ is a trademark of Digital Engineering, Inc. Tektronix® and Plot 10™ are trademarks of Tektronix, Inc. DISSPLA® and TELLAGRAF® are registered trademarks of ISSCO.

Direct Mailer Seals Profit on In-House Package

ROCHESTER, N.Y. — When a small direct mail distributor here found it couldn't find a software package to meet its somewhat specific needs, the firm's president decided to build his own. Not only did the in-house-developed package cost the firm less, the firm is now selling the package to similar users.

The Tenny Co., Inc. serves as a catalog distributor of tools and equipment to automotive, rental and farm wholesalers in the eastern 34 states. Its business has evolved from a local distribution outlet serving New York State with a traditional sales force, to a multi-state direct mail distribution network with most sales handled by phone through a network of six toll-free Wats lines, Tenny president Ron Tenny said.

In 1972 the company made a decision to change its method of sales. It eliminated the outside salesmen and converted all sales to the direct mail concept. Since a list of present customers was available and printing facilities were already in-house, the company could embark in this new direction with a minimal disruption of service.

A catalog was produced listing all of the company's products and two more Wats lines were installed. Tenny realized inventory control ultimately would play an important role in the company's future success and the ADP (National Inventory Control System) service bureau was engaged to automate the inventory and purchasing in 1973.

This proved the value of DP and the company gained an insight into the changes needed to computerize. The problem of timeliness and a lack of total control began to become more apparent as the company's growth demanded up-to-the-minute inventory control and customer accounting.

In 1975 the firm decided to investigate the possibility of installing an in-house minicomputer. Design specifications for the system centered around the requirement for an interactive, on-line software application that would allow every person in the company to access data relative to their job function, Tenny said.

While multiterminal systems are commonplace in this era of computer growth, in 1975 the concept was slowly awakening and the choices were sparse. Tenny looked at IBM, NCR Corp., Burroughs Corp., Singer Co., Microdata Corp., Wang Laboratories, Inc. and Digital Equipment Corp. in search of a suitable hardware/software combination.

IBM was quickly eliminated because its minicomputer hardware was limited to batch-oriented machines and were more costly than could be justified, Tenny said. NCR and Burroughs were eliminated from the running because the vendor's canned software was restrictive and not easily modified.

Singer had a good offering but rumors of its pending demise from the DP market were a cause of concern. Wang and Microdata looked like good hardware products, but, Tenny said, service and software support centers were too far from Rochester, N.Y. to be practical.

DEC was almost bypassed because its closest software vendor was located in Connecticut and close software support was determined to be necessary in the start-up period. After closer investigation into the DEC hardware, Tenny decided the vendor offered the best system despite the problem with software support.

DEC 356 Datasystem

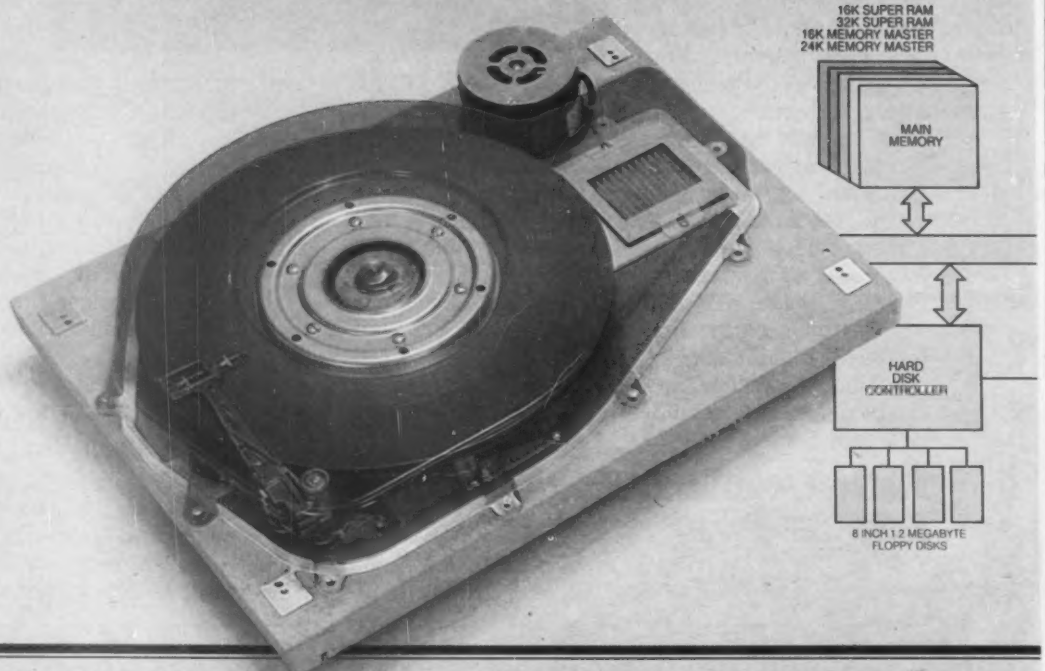
The firm installed a DEC 356 Datasystem with dual 20M-byte disk drives, a floppy drive, two terminals, a 165 char./sec matrix printer and a PDP-11/10 processor with 64K bytes of main memory in February 1976.

While preparing for delivery Tenny had talked to many lo-

CASS CAN WHEN IBM WON'T

See page 123 in Buy/Sell/Swap

While they were thinking hardware and software, we were thinking



S-100 SYSTEMS. From add-in memory boards to add-on hard disk. High performance S-100 busboards. Single, dual and quad-density disk systems with up to 1.2 megabytes on a single floppy disk drive. I/O boards. All, with the Morrow Designs systems approach to hardware and software.

COST EFFECTIVE SYSTEMS. Morrow Designs Discus M26 offers 26 usable megabytes of memory for just $4,995. About $192 per megabyte. And, it's a complete system, including a Shugart SA4008 Winchester-type sealed-media hard disk, power supply, cables, and cabinet with fan. The single board controller supervises all data transfers, communicating with the CPU through 3 I/O ports (command, status, data). The controller can generate interrupts at the completion of each command. A 512-byte sector buffer is on-board. And the system is available for S-100 mainframes.



SYSTEMS FOR SYSTEMS. Whether you're building systems or trying to expand your present system at reasonable costs, Morrow Designs offers complete, cost-effective subsystems. Modular systems that allow you to build your system your way.

SOFTWARE FOR SYSTEMS. Morrow Designs backs each subsystem with high-quality, fully-tested software. INSTALL software allows you to attach

With Minimum Disruption of Mail Service

cal first-time computer users and found the largest problem they encountered was that management was not in control of the business – the computer was! Another complaint was that management had purchased the computer as it would have any other piece of office equipment, such as a typewriter, and had not dedicated itself to working closely on the implementation.

To avoid a similar problem jeopardizing his installation, Tenny began transferring the majority of his daily job functions to his managers so he could devote his entire schedule for as long as necessary to bring the system up, Tenny said.

Tenny laid out the design around many of the features that had been useful in the service bureau system. He documented the information that was to be carried in each record field, designed report formats and described the applications required and their data flows. He then took a seven-day course at the DEC training facilities near Boston. With this background in the Dibol programming language and the basics of system design he began to work with the analyst to lay out the system, the company president recalled.

It soon became apparent that the project would be severely limited by three factors. First, the supplier's analyst was not familiar with the complexities of the direct-mail business and as time progressed the ability to translate the need for new applications contracted for and modifications to existing programs degenerated.

Second, the distance between Tenny's Rochester offices and Connecticut became a real barrier to keeping the system operational.

These first two factors forced Tenny to begin making changes in the code to keep the system running, he said.

As time progressed, his proficiency increased to the point where he was rewriting entire programs to eliminate problems with poorly written code.

The third problem with the system was that it had been sold to support a maximum of seven terminals with a memory expansion option. Not only did the memory not become available from DEC, but it discontinued the processor from its line of active products, making any future expansion impossible. This put a limit on the system of three or four terminals and then only if the larger programs were completely rewritten with complex program overlays, according to Tenny.

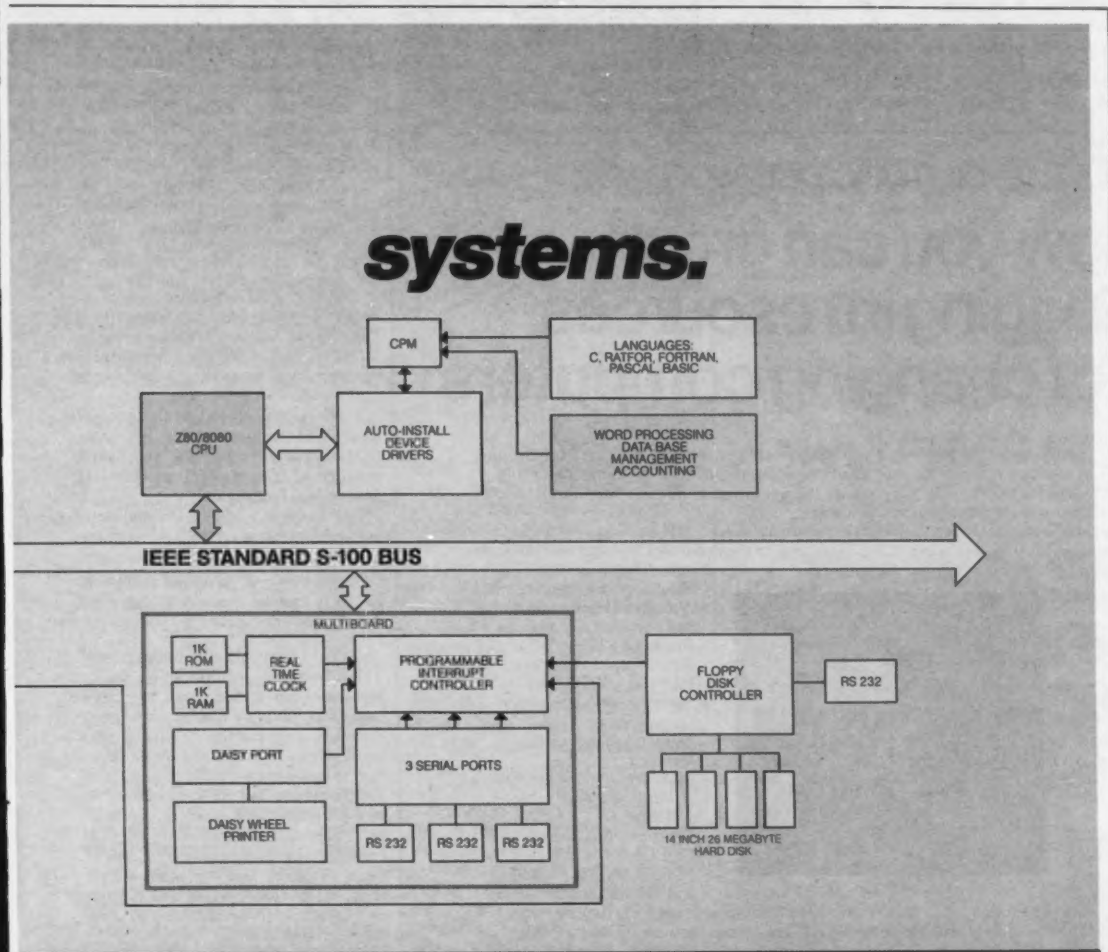
Purchase Contract

With these three major problems facing the company, Tenny decided to negotiate a contract for purchase of the PDP-11/34 CPU supporting up to 256K bytes of main memory in return for cancellation of any future obligations to the vendor and exclusive rights to any software already delivered, he said.

By the time the new CPU was installed in December 1977, Tenny had finished the first phase of a major overhaul of accounts receivable and pay history tracking. Vendor purchasing and mailing list maintenance and label print programs were finished. Order entry, order maintenance and invoicing programs were rewritten from the ground up, Tenny said.

Since that time an economic order quantity (EOQ) algorithm has been developed and installed in the purchasing module. It takes the majority of guesswork out of the buyer's hands by taking into account the past 13 months' sales history, vendor ship lag, package quantities and activity codes.

An information system has also been developed so that every salesman's terminal allows him to access data on any part file, vendor order, customer file, customer backorder and customer shipment. All these files are accessed in less than one second.



any Morrow disk system to any CP/M system operating under CP/M. Morrow CPM/CDOS software allows you to attach any Morrow disk drive to Cromemco Systems. In fact, if software runs under CP/M, it will run on any Morrow Designs hardware.

COMPARE PERFORMANCE. Hardware performance. Software performance. System performance. Any Morrow Designs disk drive, hard or floppy, can be mixed and matched through Morrow Designs standard software. And all necessary hardware, software and firmware is included with each system.

NOW, COMPARE PRICE. Morrow Designs products offer maximum efficiency at minimum cost. But we don't cut corners. What that means to you is reliable system efficiency at cost effective prices.



Better systems for less. See Morrow Designs full line of memory and I/O, plus floppy disk/and the M26 hard disk system at your computer supplier. Or, send in the coupon for our full line catalog. Can't wait: Call us at (415) 524-2101.

MORROW DESIGNS

5221 Central Ave. Richmond, CA 94804

Gentlemen, Please send me your complete OEM hardware and software specifications. Plus the name of my nearest distributor.

Name_____

Company_____

Address_____

City_____ State_____ Zip_____

VOLUME DATA ENTRY SERVICES
AKD HOTLINE
for INSTANT QUOTES
• OMAHA
(800) 228-9410
TWX 9106220199
AMERICAN KEY DATA
Mid America Plaza, Suite 144
7171 Mercy Rd., Omaha, Ne. 68106

Managers on the Move

Facit, Inc. has promoted TOM KOONTZ to vice-president and general sales manager of western operations. He will be responsible for office and data products sales at Facit's offices in Gardena, Calif.

He joined Facit in 1963 as retail manager for typewriters and adding machines at the Oakland, Calif., branch. When Facit opened its Data Systems Division in 1966, Koontz was appointed sales manager of the western division. Since then he has been western OEM data sales manager and most recently western manager of the Data Products Division.

•••

Radio Shack has named two divisional computer marketing managers, JOHN E. ROY for the Southeast and HOWARD D. ELIAS in the Midwest market area. They will be responsible for developing and coordinating the marketing efforts for the computer centers in their respective locations.

Before his promotion, Roy was manager of Radio Shack's center in Tampa, Fla. He joined the company as a store manager trainee in 1977. Prior to that he was employed at Burroughs Corp. in minicomputer systems sales. Roy is a graduate of the University of South Florida in Tampa with a B.A. degree in business management.

Elias was manager of the Detroit computer center. He joined the company as a salesman, then became manager of the Radio Shack store in Ferndale, Mich., in 1976. Prior to that, Elias was with the Board of Education of Southfield Schools in Michigan.

•••

GTE Automatic Electric, Inc. has appointed KATHARINE R. HARRISS supervisor of public information at the company's Northlake, Ill., headquarters. Harriss is responsibie for planning, preparation and dissemination of GTEs information to the public and news media.

She recently served as GTE's public affairs coordinator, developing and implementing communications programs for the Automatic Electric Laboratories.

Prior to that, she was employed by AT&T Long Lines in Chicago and Bell Laboratories in Naperville, Ill.

Harriss has a B.A. degree in Engish/-communications from Denison University in Granville, Ohio.

•••

GERRY W. TRICHEL has been named manager of corporate data processing at Zurn Industries, Inc. in Erie, Pa.

Trichel assumes responsibility for the direction of Zurn's DP activities: planning, implementation, coordination and supervision functions throughout the company.

Prior to joining Zurn, he served the Hammermill Paper Co. of Erie as general manager for field support, manager for technical services, manager for systems and programming and operations research analyst. Prior to that, he was employed as an industrial engineer with Reynolds Metals Co., Corpus Christi, Texas.

Trichel received a B.S. degree in industrial engineering from Southern Methodist University, Dallas.

•••

JACOB L. KATZ has been named director of systems and programming at Certainteed Corp., headquartered in Blue Bell, Pa. He will be responsible for systems development at the company's U.S. locations.

Prior to joining Certainteed, Katz was director of data processing for Commodore International, Ltd. and held a number of management positions at Macmillan, Inc.

Katz has a B.S. degree in industrial management and an M.B.A. in management science and information systems from La Salle College, Philadelphia, Pa.

•••

St. Paul Financial Services has named THOMAS W. McKEOWN senior vice-president in the Executive Division of St.Paul Fire and Marine Insurance Co. and JOHN C. FIELD succeeds McKeown as head of information systems at St. Paul.

McKeown joined St. Paul in 1977 as vice-president and head of its computer operations. Previously he was employed by Honeywell, Inc. for 17 years as director of the internal systems and services operation of Honeywell Information Systems and in other managerial positions.

Field has been with St.Paul since January, joining the company from Tonka Corp., where he was head of management information systems and corporate planning. Prior to that, he spent 11 years with Honeywell in its systems and data processing operations.

•••

AM International has named FRANK X. MULLIGAN vice-president of finance and administration for AM Jacquard Systems in Santa Monica, Calif. and ROY W. TILSLEY has been appointed vice-president of finance for AM ECRM in Bedford, Mass.

Mulligan will be responsible for the planning and analysis, accounting and order administration of the division's financial activities. He will also oversee employee relations and facilities management.

Mulligan recently served Intel Corp. as corporate controller and president of the Lease Administration Division.

BTI 8000 32-bit multiprocessor system

Now you can grow by plugging in resources instead of changing computers

Finally, there's a computer system that lets you grow by plugging in resources, instead of by changing models – the BTI 8000.

The secret is Variable Resource Architecture (VRA): a flexible mix of hardware resources controlled by a single, self-regulating operating system.

Hardware resources consist of multiple processors, memories, and input-output channels operating in parallel without the complex internal networking normally associated with such arrangements. The result is mainframe performance at substantially lower costs, plus unequalled flexibility.



You can tailor the BTI 8000 to serve over 200 on-line, interactive users. Or to handle large batch loads. Or to do a lot of each.

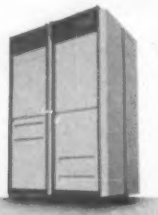
Furthermore, you can vary processing capability over a tenfold range by merely adding or deleting hardware modules. Differences in configuration are invisible to user software, and no reprogramming or recompilation is required.

Additionally, built-in growth potential allows you to respond to changing workload requirements easily and quickly – without modifying either the operating system or your applications software.

Key features of each BTI 8000 system include:

- From one to eight 32-bit CPUs controlled and coordinated by one shared operating system.
- Up to 16 megabytes of main memory.
- From 4 to 32 input-output channels.
- Fail soft architecture.
- Secure multi-user operations.
- Demand-paged virtual memory.
- Task oriented assignment of hardware and software.
- Simultaneous use of ANS COBOL 74, ANS FORTRAN 77, PASCAL, and BASIC/8000.

As for reliability and support, they're established BTI traditions, proven by over 2,500 other BTI computers operating in the U.S., Canada and Europe. For full details about the BTI 8000, contact the BTI office nearest you.



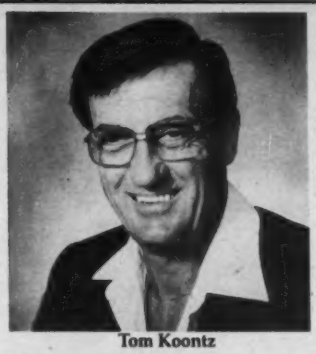
BTI COMPUTER SYSTEMS

Corporate Offices: 870 West Maude Avenue, Sunnyvale, CA (408) 733-1122 Regional Offices: Piscataway, NJ (201) 457-0600; Palatine, IL (312) 397-9190; Dallas, TX (214) 630-2431; Sunnyvale, CA (408) 733-1122. Sales Offices in major U.S. cities. In the United Kingdom: Birmingham (021)-477-3846

BTI is a registered trademark of BTI Computer Systems



Katharine R. Harriss



Tom Koontz

Previously he spent 15 years with Litton Industries as group controller and vice-president of finance for the Professional Services Group. He graduated with a B.A. degree in economics and received an M.B.A. from Stanford University.

In his new position, Tilsley is responsible for AM ECRM's financial forecasting and budgeting, inventory control, general accounting and credit and collections.

Tilsley recently served as management information systems vice-president and controller for Waldorth Corp. He was previously employed by Coopers & Lybrand, Relief Printing Corp. and Studley Shupert Co. Tilsley graduated from Boston College with a B.S. degree in accounting.

• • •

JOSEPH L. SCHWARTZ, M.D. has been named medical director of Comprehensive Medical Systems, Costa Mesa, Calif. Schwartz is a practicing general surgeon in Huntington Beach.

He will serve as a consultant to Status users, and his opinions will also be sought on any modifications or changes proposed for the software packages. Schwartz worked with the developers of Status, the company's physician practice management system, and is the author of several programs included in Status.

Schwartz received his Ph.D. from the University of Virginia.

• • •

JAMES P. WALLACE has been named director of management information systems for the Optoelectronics Division of General Instrument in Palo Alto, Calif.

Wallace will be responsible for data processing activities, including the operation of the computer center and development of information systems.

He was previously employed at Itel, Ampex and Varian.



Gerry W. Trichel

He received an M.B.A. from Santa Clara University and a B.S. in business administration from Woodbury University.

• • •

JOSEPH CHATTINGER has been named director of systems development at the American Automobile Association of Michigan.

He joined the Dearborn operation in 1966 as a programmer, later becoming systems and programming supervisor, general supervisor of member and policyholder services, Maps assistant manager and collection manager.

• • •

JOSEPH T. McNALLY has been elected manager and vice-president of data systems at Stone & Webster Management Consultants, Inc., New York.

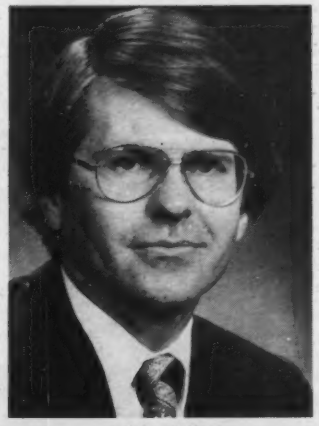
He will direct consulting and appraisal services to business, industry, utilities and government agencies.

McNally has been with Stone & Webster since 1969 and was previously employed by Todd Shipyards and General Dynamics Corp. as a consultant.

He is a graduate of Pace University, New York, with a B.B.A. in accounting.



Howard D. Elias



John E. Roy

212A Modem Users:



Why pay for 1200 and 300 bits per second when you're only using 1200?

If you're like most remote site 212A users, you're operating your modem in the high speed mode only. Yet you're paying a high price for both 1200 and 300 bps, because you've really had no choice.

You have a choice with Multi-Tech. Our MT212D modem operates at 1200 bps, full-duplex, and is compatible with other 212A's at that speed. Our MT212A provides both 1200 and 300 bps capability, and can be used as a full 212A replacement. Both the MT212D and the MT212A feature a unique call-originating configuration which permits the use of a standard telephone set, without special switches, jacks and adaptors.

The MT212D, with its single speed and call-origination capabilities, is available at a price far below that of the dual-speed 212A's now on the market. Take advantage of our choice. Call or write us for more information.

MULTI-TECH SYSTEMS, INC.

Quality You Can Rely On

82 SECOND AVENUE S.E. • NEW BRIGHTON, MINNESOTA 55112 • (612) 631-3550 • TWX 910-563-3610

The Ohio Scientific C2-OEM is a typical microcomputer at a special price!

The Ohio Scientific C2-OEM is designed for business and industrial applications which can effectively use typical microcomputer speeds. But, that's where its similarity to others in its class stops.

- Full business configuration — standard.
- 48K dynamic RAM
- .35 MIPS 6502 CPU
- RS 232 port at 300 to 19,200 baud.
- Dual 8" floppies store 600Kbytes.
- OSI BUS oriented for modular expansion.
- Two slots in base machine; six open for expansion.
- Fast low overhead disk operating system — standard.
- Microsoft BASIC with random and sequential access files.
- Instant load disk bootstrap and front panel emulator in ROM.



$2799

The C2-OEM cabinet can be table top, rack mounted or incorporated in a matching desk which will accommodate a CRT terminal and printer. Industry standard parts provide very reliable operation and easy service. And best of all, the C2-OEM can make use of most of the business application software and accessories for the popular, premium performance Ohio Scientific Challenger III.

Available in OEM quantities at attractive discounts.

For literature and the name of your local dealer, CALL 1-800-321-6850 TOLL FREE.

OHIO SCIENTIFIC

1333 SOUTH CHILLICOTHE ROAD
AURORA, OH 44202 • (216) 831-5600

With Electronic Phone Directory

French Let 'Fingers Do Walking' on Keyboards

SAINT-MALO, France — Some residents of this popular coastal resort area of France no longer "let their fingers do the walking."

Instead, their electronic telephone directory promptly displays the number they need on a screen in their home or office. Rather than searching through the pages of a bulky telephone directory, they "instruct" the electronic directory by typing the required information on an alphanumeric keyboard.

Dozens of Saint-Malo residents and businesses last summer became pioneers in the first large-scale test of France's plan to eliminate conventional telephone directories and the telephone information service. The electronic directory, according to the French telephone company, is easier to use, faster — and cheaper.

In lieu of telephone directories, the phone company will provide every customer — private or business — with an electronic terminal. Over the next 10 years, it expects to distribute more than 30 million free terminals.

It will still be cheaper than publishing conventional telephone directories and updating them yearly, the phone company said. It will also be more efficient, because the electronic directory will always be completely up-to-date.

Started in mid-July, the Saint-Malo test is the first of several throughout France. By next year, some 250,000 terminals will be installed in the Ille et Vilaine region, around Saint-Malo.

'Makes Life Easier'

So far, the customers seem to like it. A 63-year old retired woman, Mme. Rochard, told an interviewer, "For the time being, the service is a little bit limited, but I think it's going to improve. I'm all for that. We should have access to all the things we need, the things that make life easier."

A wine agent who carries on business throughout France, M. Laine, who is 50, can not wait to see the day when he can call for telephone directory information anywhere in the country.

"I'm extremely fascinated by the information display capabilities of the terminal," he said. "For this initial testing period, I rely on this device to lighten my office records.

"But what will be fantastic in the future is to have access to all the daily information which is relevant to my business. I shall then have at my disposal an extraordinary tool," he added.

One Surprise

One surprise of the test was the comparative ease with which consumers adjusted to the new device.

Commented M. Germa, director of the Havas Sociological Research Center, which monitored the trial:

"The terminal was immediately accepted in the home or office. The participants in the trial had no trouble operating it. Obviously, a little training has to be done, but the essential fact is that the electronic telephone directory is no more complicated than a pocket calculator."



French teenager participating in the Saint-Malo project tries out the electronic directory.

Here's how it works. Supposing you need the number of a waffle restaurant (a regional speciality). You would type in "waffle restaurants" and an index of those in the area appears on the screen.

You can then further define the restaurant of your choice by typing in its name, which will result in a display of that specific menu, complete with prices, closing time and other pertinent information. Then, call the number and make your reservation. Simple as that.

But one of the most useful features, according to residents, is the listing of emergency numbers for hospital, ambulances, police, fire and other services.

Instructions for use and for helping those who have misdialed are also displayed on the screen. And if the user is really confused, there is still a human backup system.

Altogether, there are 30,000 entries in the data base being tested in Saint-Malo. The test will help to define the most acceptable form of access and also the effectiveness of the dialogue employed.

The electronic directory is one of several new telecommunications projects being developed under a national program known as Telematique. Others include Teletel, the French two-way videotex systems of which the Electronic Directory is the simplest form; two-way facsimile service for the home; a free-form telewriting system; smart-card technology and complete teleconference facilities for corporations.

These systems will be mass marketed at a relatively low cost as a result of new developments in microprocessors and digital technology.

NOW ON EAST COAST

Terminal Systems proudly announces the opening of an east coast sales office under the direction of Mr. Vince Littlefield at 151 Nahma Trail, Medford Lakes, N.J. 08055

Providing outstanding service to western, midwestern, and world-wide customers since 1964, TSI specializes in the sales, leasing, rentals and service of communications-handling equipment including:

VIDEO DATA TERMINALS, MODEMS, DISC AND CASSETTE MEMORY DEVICES, 32, 33, 40 & 43 TELEPRINTERS, TWX, TELEX, CUSTOM INTERFACES & PCBs, MINICOMPUTERS AND THE TELETICKETER.

TERMINAL Systems, Inc.

11300 HARTLAND STREET, NORTH HOLLYWOOD, CALIFORNIA 91605
(213)769-6772/877-1385 Outside California TOLL FREE 800-423-2448
East Coast 151 Nahma Trail, Medford Lakes, NJ 08055 • 609/953-1248

Is your "state-of-the-art" industry still collecting antiques?

Today's complex industries require immediate, accurate data on every employee. Concise, up-to-the-minute payroll information is essential. Attendance and manpower loading must be constantly monitored. Yet with old-fashioned mechanical time clocks, instantaneous information is impossible.

Now you can improve your data acquisition system with our Data Entry Terminals (DET). They send vital information on your personnel directly into your computer. Panasonic DET's are designed to interface with most existing DP equipment. Available options let you add the special capabilities you need.

For more information on our DET Systems*, write or call Panasonic Company, Data Communications Group, 425 Algonquin Road, Arlington Heights, IL 60005, (312) 364-7900 extension 304.

*Distributor inquiries invited.



Panasonic DET: The real time, on-line time clock.

Panasonic. just slightly ahead of our time



'You're Here for That Keypunch Operator's Job, Too, Huh?'

CCP ANNUAL EXAMINATION

SCHEDULED FOR DECEMBER 13, 1980

The annual examination for the Certificate in Computer Programming (CCP) will be held on December 13, 1980, at selected test centers throughout the world.

Specific requirements for this year's examination are detailed in the "Certificate in Computer Programming Examination Announcement and Study Guide." The study guide and application form for the 1980 examination are available on request from ICCP.

Deadline for Filing Application is October 15, 1980

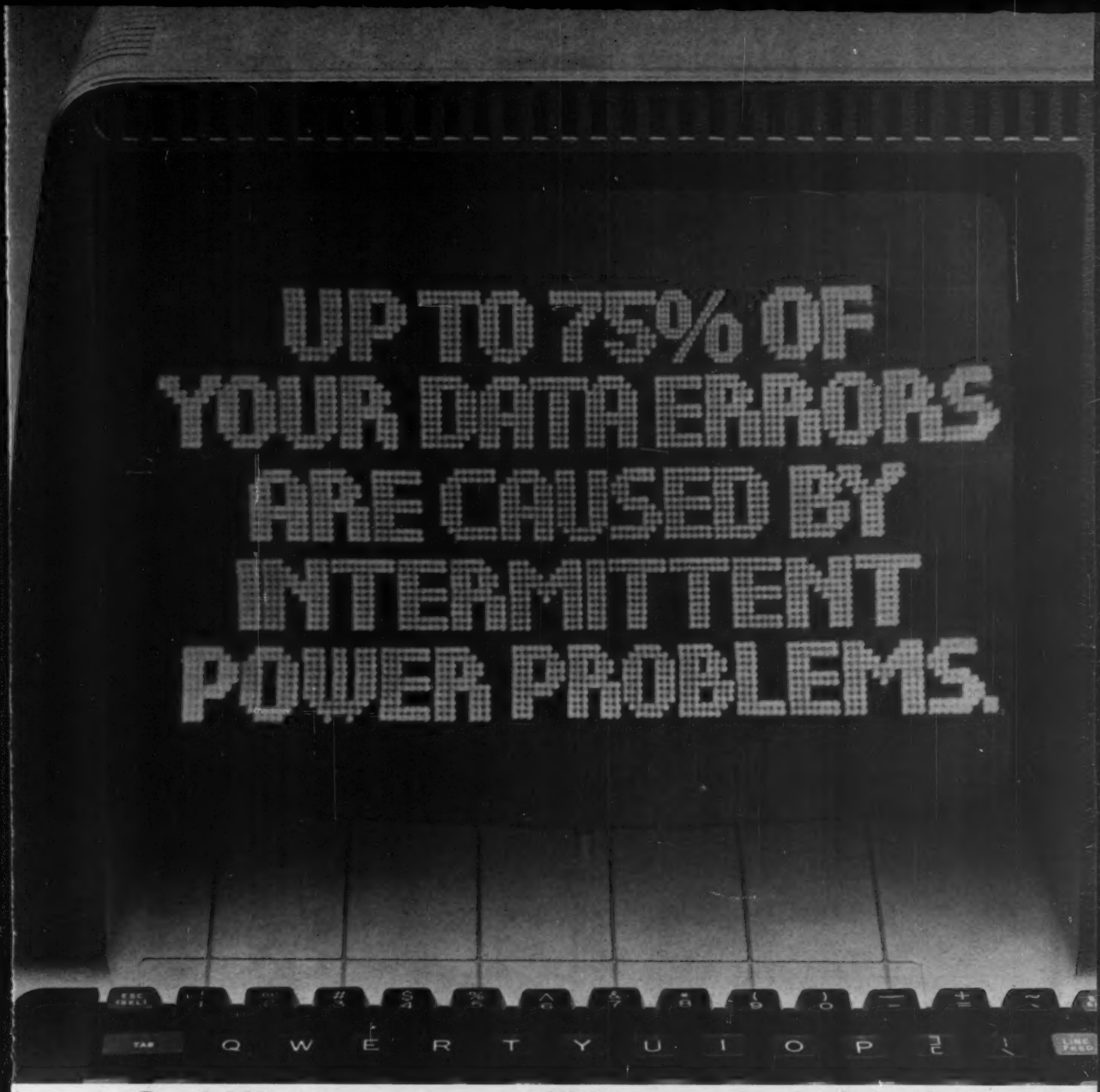
Please forward the "Certificate in Computer Programming Examination Announcement and Study Guide" along with application and test site list.

Name

Street Address

City State or Province Zip Code

MAIL COUPON TO: Institute for Certification of Computer Professionals/Certification and Testing Section 304 East 45th Street New York, N. Y. 10017



Stabiline® power conditioners slash data loss and errors.

Most data loss and errors are caused by electrical noise and line voltage fluctuations. Not by your hardware or software, as many people think.

Stabiline® Automatic Voltage Regulators intercept these power irregularities before they can cause problems in microprocessors and computers. They virtually eliminate powerline variations before they create erratic operations, damage components or shorten equipment life.

Let us show you how to condition your power input with one of Superior Electric's many power conditioners. All designed with state-of-the-art technology to provide smooth, dependable power, in lightweight, low cost units.

Call Richard Pettey 203-582-9561 or write The Superior Electric Company, Bristol, CT 06010 today for a FREE problem power troubleshooting manual and complete product information.

Please send me the new Superior Electric troubleshooting manual.

Name

Title

Company

Address

City State Zip

Nature of business



Superior Electric

© 1980 The Superior Electric Company. Stabiline® Automatic Voltage Regulators is a Reg. TM of The Superior Electric Company.

Calendar

Oct. 13-14, Chicago — **Auditing Procedure for NCR Computer Applications.** Contact: EDP Audit Associates, Inc., P.O. Box 366, Summit, Ill. 60501. Also being held Oct. 20-21 in Boston and Oct. 30-31 in Houston.

Oct. 23, St. Louis — **Business Information Systems,** sponsored by the Data Processing Management Association. Contact: Vicki James, Washington University, Center for the Study of Data Processing, Campus Box 1141, St. Louis, Mo. 63130.

Oct. 23-24, Miami — **Data Base Management Systems, Concepts and Modeling.** Contact: SCS International, P.O. Box 344010, Coral Gables, Fla. 33114.

Oct. 24, Boston — **Northeast Computer Law Institute.** Contact: New England Law Institute, Inc., Massachusetts Continuing Legal Education, 1387 Main St., Springfield, Mass. 01103.

Oct. 29-30, Chicago — **Recovery/-Restart.** Contact: On Line Software International, 65 Rt. 4 E., River Edge, N.J. 07661.

Oct. 30-Nov. 1, New York — **National Small Computer Show.** Contact: Ralph Ianuzzi, 110 Charlotte Place, Englewood Cliffs, N.J. 07632.

Nov. 2-5, Washington, D.C. — **Computer Applications in Medical Care,** sponsored by the Institute of Electrical & Electronic Engineers. Contact: H. Orthner, George Washington University Medical Center, Dept. of Clinical Engineering, Washington, D.C. 20037.

Nov. 3-4, Richardson, Texas — **Data Courier On-line Training.** Contact: Data Courier, Inc., 620 S. Fifth St., Louisville, Ky. 40202. Also being held Nov. 6-7 in Houston.

Nov. 3-5, Cambridge, Mass. — **Computer Graphics in CAD/CAM Systems.** Contact: Prof. David C. Gossard, MIT, Department of Mechanical Engineering, Room 3-445, 77 Massachusetts Ave., Cambridge, Mass. 02139.

Nov. 3-6, New York — **Telecommunications Management for Profit.** Contact: MCI Education Center, 1301 Ave. of the Americas, New York, N.Y. 10019. Also being held Nov. 8-11 in Cincinnati.

Nov. 3-7, Philadelphia — **Computer Auditing.** Contact: RHY Consultants, Inc., P.O. Box 21026, St. Paul, Minn. 55121.

Nov. 3-7, Toronto — **MVS Internal Logic, Systems Design and Performance.** Contact: Computer Research Systems, Inc., 195 W. Main St., P.O. Box 45, Avon, Conn. 06001.

Nov. 3-7, Boston — **Structured Data Base Design.** Contact: Improved Systems Technologies, Inc., Suite 4500, 888 Seventh Ave., New York, N.Y. 10106. Also being held Nov. 10-14 in Montreal.

Nov. 3-7, Detroit — **CICS/VS Application Programming.** Contact: On Line Software International, 65 Route 4 E., River Edge, N.J. 07661.

Nov. 4-6, London — **Compec,** sponsored by *Computer Weekly, Practical Computing* and *Data Processing & Systems International.* Contact: IPC Exhibitions Ltd., 40 Bowling Green Lane, London EC1R 1, UK.

Nov. 4-6, Washington, D.C. — **Federal Office Automation Conference,** sponsored by Federal Office Institute. Contact: Federal Office Automation, P.O. Box E, Wayland, Mass. 01778.

Nov. 4-6, San Jose, Calif. — **Word Processing and Office Business Equipment Trade Show.** Contact: Cartlidge & Associates, Inc., Suite 1014, 491 Macara Ave., Sunnyvale, Calif. 94086.

Nov. 4-6, Phoenix — **Auditing, Security and Controls.** Contact: Advanced Computer Techniques Corp., 222 N. Central Ave., Phoenix, Ariz. 85004.

Nov. 4-6, London — **Computer Peripheral and Small Systems Exhibition.** Contact: British Information Services, 845 Third Ave., New York, N.Y. 10022.

Nov. 4-6, Dallas — **Midcon/80 Electronic Show and Convention,** sponsored by the Institute of Electrical and Electronic Engineers. Contact: Electronic Conventions, Inc., 999 N. Sepulveda Blvd., El Segundo, Calif. 90245.

Nov. 4-6, Kakuku, Hawaii — **Data Entry Productivity.** Contact: Data Entry Digest, 10522 Ridgeway Drive, Santa Ana, Calif. 92705.

Nov. 4-7, San Diego — **Decus Symposium,** sponsored by Digital Equipment Computers Users Society. Contact: Paula Morin, 1 Iron Way, MR2-3/E55, Marlboro, Mass. 01752.

Nov. 4-7, Boston — **Voice Input/Output for Computers.** Contact: Integrated Computer Systems, 3304 Pico Blvd., P.O. Box 5339, Santa Monica, Calif. 90405.

Nov. 4-7, Wellesley, Mass. — **Human Relations: Productive Working Relationships.** Contact: Q.E.D. Information Sciences, Inc., 180 Linden St., P.O. Box 181, Wellesley, Mass. 02181.

Nov. 5-6, Boston — **Digital PABX: What It's All About.** Contact: the American Institute for Professional Education, Carnegie Building, Hillcrest Road, Madison, N.J. 07940.

Nov. 5-7, Indianapolis — **Distributed Computing Systems.** Contact: Q.E.D. Information Sciences, Inc., 180 Linden St., P.O. Box 181, Wellesley, Mass. 02181.

Nov. 5-7, Chicago — **Data Base Management Systems: A Comparative Analysis of General-Purpose Systems.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held Nov. 19-21 in San Francisco.

Nov. 5-7, Washington, D.C. — **Audit & Control of On-Line Systems.** Contact: Institute for Professional Education, Suite 303, 1515 N. Court House Road, Arlington, Va. 22201.

Nov. 5-7, Atlanta — **International Telecommunications.** Contact: Telecomm Systems Group, Inc., 579 Pompton Ave., Cedar Grove, N.J. 07009.

Nov. 5-7, New York — **Distributed Systems: Effective Approaches and Applications.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Nov. 5-7, Boston — **Managing the DP Professional - The Challenge of the 80s.** Contact: UBI Enterprises, 30 Milbank Ave., Greenwich, Conn. 06830.

Nov. 5-7, Bedford, Mass. — **Military Communications Systems Control.** Contact: Mitre Corp., P.O. Box 208, Bedford, Mass. 01730.

Nov. 5-7, Chicago — **Automating Your Office Today: Planning and Implementation Methods.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held Nov. 17-19 in Los Angeles.

Nov. 5-7, San Francisco — **Word Processing.** Contact: Institute for Professional Education, Suite 303, 1515 N. Court House Road, Arlington, Va. 22201.

Nov. 5-7, San Francisco — **Effective Data Systems Development.** Contact: Arnold Barnett, Barnett Data Systems, Inc., 19 Orchard Way N., Rockville, Md. 20854.

Nov. 5-7, New Orleans — **Analyzer Users Conference.** Contact: Liz Toronto, Program Products, Inc., 95 Chestnut Ridge Road, Montvale, N.J. 07645.

Nov. 5-7, Washington, D.C. — **Data Communications Systems.** Contact: American Institute for Professional Education, Carnegie Building, Hillcrest Road, Madison, N.J. 07840.

Nov. 5-7, Chicago — **Data Base Management Systems: Concepts & Facilities.** Contact: University of Chicago, Center for Continuing Education, 1307 E. 60 St., Chicago, Ill. 60637.

Nov. 5-7, San Francisco — **Introduction to Teleprocessing Software.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held Nov. 19-21 in New York.

Nov. 5-7, Chicago — **Data Communications: An Introduction to Concepts and Systems.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held Nov. 17-19 in Los Angeles.

Nov. 6, London — **CMCS Introductory Overview.** Contact: STSC, Inc., 11 Clearbrook Road, Elmsford, N.Y. 10523.

Nov. 6-7, Washington, D.C. — **Data Processing for Secretaries and Administrative Support Personnel.** Contact: Management Resources International, Inc., 6621 Electronic Drive, Springfield, Va. 22151

Nov. 6-7, Washington, D.C. — **Computer-Micrographics Interface Computer Output Microfilm and Computer Assisted Retrieval.** Contact: George Washington University, School of Engineering and Applied Science, Washington, D.C. 20052.

Nov. 6-7, San Francisco — **Data Processing Resource Management.** Contact: Brian F. Crynes, Price Waterhouse & Co., 1251 Ave. of the Americas, New York, N.Y. 10020.

Nov. 6-7, New York — **Computer Law: Purchasing, Leasing and Licensing Hardware, Software and Services.** Contact: Practicing Law Institute, 810 Seventh Ave., New York, N.Y. 10019.

Nov. 6-8, Paris — **Systems Dynamics and the Analysis of Change.** Contact: Association Francaise Pour la Cybernetique Economique et Technique, 156, Blvd. Pereire, F. 75017 Paris, France.

Nov. 7-10, Madrid, Spain — **Introductory APL.** Contact: STSC, Inc., 11 Clearbrook Road, Elmsford, N.Y. 10523. Also being held Nov. 11-13 in London and Nov. 24-28 in Dusseldorf.

Nov. 8-10, Hamilton, Bermuda — **Computing '80.** Contact: Rick Gerhardt, Computer Society of Bermuda, P.O. Box 1479, Hamilton 5, Bermuda.

DAS
THE DATA TERMINAL AND SYSTEMS PEOPLE

Data Terminals from DASI

MODEL #	PURCH. PRICE	ANN. SERVICE	12-MO. LEASE W/SERVICE
TI 745	$1595	5216	$ 90
TI 765	2695	312	135
TI 810 PKG.	1955	312	110
TI 820 PKG.	2295	324	100
TI 825 PKG.	1795	252	85
DEC LA 34	1095	198	65
DEC LA 120	2495	330	135
DEC VT 100	1895	187	105
VISUAL 100	1595	187	80
LSI ADM 3	850	180	50
LSI 31	1370	286	75
LSI 42	2095	330	105
TTY 43 AAK	1350	220	70
HAZELTINE 1420	950	180	62
HAZELTINE 1520	1450	240	96
GE 2030	1450	230	80
DIABLO 630	2430	330	120
DIABLO 1640	3195	363	160
DIABLO 1650	3295	363	165
HP 2621A	—	192	80
HP 2621P	—	324	150

• Quantity discounts available • Local stocking warehouses
• 5% Discount C.O.D. • Complete line of supplies
• DASI is nationwide with nationwide service

Corporate Offices: Cole Rd. & Camden Ave., Blackwood, N.J. 08012 (609) 228-0700; Toll Free (800) 257-7748. In New Jersey, (800) 232-6510.

District Offices: Atlanta—(404) 449-5435 • **Boston**—(617) 769-6420 • **Chicago**—(312) 967-0440 • **Cleveland**—(216) 473-2131 • **Dallas**—(214) 256-5536 • **Denver**—(303) 741-2922 • **Detroit**—(313) 589-1409 • **Houston**—(713) 682-5965 • **L.A.**—(213) 536-4100 • **Milwaukee**—(414) 963-9008 • **Minneapolis**—(612) 854-4466 • **N.J.**—(201) 227-8880 • **N.Y.C.**—(212) 564-9301 • **Philadelphia**—(215) 667-8315 • **Phoenix**—(602) 263-5034 • **Portland**—(503) 644-8600 • **Rochester**—(716) 377-2080 • **San Antonio**—(512) 657-5941 • **S.F.**—(415) 872-1811 • **Seattle**—(206) 251-5070 • **Wash., D.C.**—(301) 459-3377

TWX # 510-686-2932 **GSA Contract # GS-00C-02234 3-31-81**

How to Increase Productivity?

Turnaround Time
By Larry E. Long

Q As the newly appointed supervisor of corporate systems development, I am very interested in increasing the productivity of my staff and would like to obtain information on techniques for improving programming productivity.

I would appreciate any information you might have and any recommendations on publications and how they can be obtained.

A The "I-want-it-yesterday" syndrome surrounding DP activity has delayed many attempts to increase general productivity and specific programming.

But attention to a few basic concepts, tools and techniques can render enormous increases in programmer productivity. These include:

- Mode of program development — benefits of interactive program development are overwhelming.
- Choice of programming language — match to application requirements; use interpreter-based languages for "quick and dirty" programs; use state-of-the-art compilers.
- DBMS — to make programs independent of data structure.
- Other software aids — inquiry languages, report writers, judicious use of existing software.
- System development methodology — integrated procedures for structured analysis, design and documentation.
- Library of reusable code — modules that are indexed and cataloged for easy reference.
- Chief programmer teams — flexibility to relocate line programmers to priority projects.
- Structured walkthroughs — peer reviews to insure the accuracy and quality of the end product.
- Scheduling — to level work load and keep individual assignments at or above 100%.
- De-emphasis on extremely efficient code — savings of 2 msec/transaction does not merit the expenditure of 2 man-months of effort.
- Recruiting practices — all programmers are not created equal, 10% more salary may yield 100% more production.
- Retention — one person retained may result in a man-year of effort saved in the recruiting and training of a replacement.

The above list is not exhaustive but should provide a starting point for self-examination.

Column space precludes listing the many good books which deal with the general topic of programming productivity.

Q If I was to characterize the greatest deficiency at our installation, it would surely be project estimation.

Do you know of any project-estimating formulas with proven accuracy for various levels of programmers and analysts?

A I am not an advocate of the use of formulas for making estimates. The key to successful project estimation — and subsequently management — is simplicity.

These formulas require numerous subjective evaluations such as programmer capability, system complexity, probability of completion by a certain date and so on. Some require an estimate of lines of codes before the number of programs is known.

Although the formulas provide a rigorous approach to estimation, the substantial requirement for subjective input tends to negate the effect of the rigor.

The work required to produce the input and the quality of the resulting estimates do not justify the effort.

There is no secret to making good estimates. However, the proper setting for good project estimating can be created by the existence of a preliminary general design (vs. a concept) — a system development methodology with phases and milestones and experienced DP professionals.

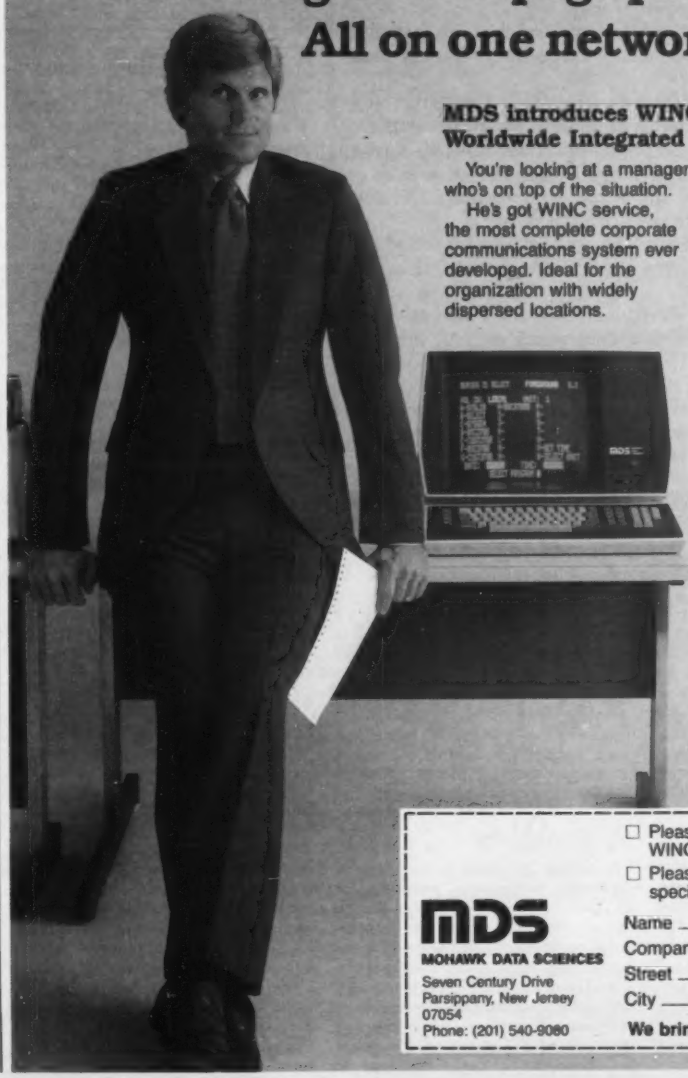
The design defines the scope of the project and provides the detail necessary to identify logical system modules. The methodology provides a vehicle for making intermediate estimates and gathering historical statistics. I am convinced that experienced professionals can subjectively factor in such variables as system complexity and level of programmer and analyst better than formulas.

With historical statistics, a preliminary general design and other subjective variables such as input, experienced DP professionals can use the Delphi and Nominal group techniques to arrive at reasonably accurate consensus estimates of time, manpower and costs.

Have a question? Send it to Larry Long, Editorial Department, Computerworld, 375 Cochituate Road, Rt. 30, Framingham, Mass. 01701.

Long is a professor at Lehigh University, a DP consultant and author.

He just sent an electronic memo to 16 domestic and overseas branches, received the new sales report data, and revised and distributed the wording of a 30-page proposal. All on one network system.



MDS introduces WINC service. Worldwide Integrated Communications.

You're looking at a manager who's on top of the situation.

He's got WINC service, the most complete corporate communications system ever developed. Ideal for the organization with widely dispersed locations.

WINC service is efficient intra-company electronic mail. With direct ties to domestic and international common carriers.

WINC service is worldwide communications combined with distributed processing. It provides programmability, custom software and a wide range of peripherals.

And WINC service is full-featured, big screen word processing which can be quickly distributed.

With WINC service, MDS assumes the responsibility for fully managing your network. It's easily implemented and highly cost effective.

For the full details, including the unsurpassed variety of terminals and terminal systems available from MDS, mail the coupon.

We'll bring you the world in a WINC.

☐ Please send more information on WINC service.

☐ Please have an MDS WINC service specialist call for an appointment.

Name _____

Company _____

Street _____

City _____ State ___ Zip ___

MDS
MOHAWK DATA SCIENCES
Seven Century Drive
Parsippany, New Jersey
07054
Phone: (201) 540-9080

We bring you the world in a WINC.

CW10/80

EDITORIAL

Conference Conflicts

Telecommunications managers in San Diego . . . MIS managers in Philadelphia . . . federal DPers in the nation's capitol . . . software gurus and purchasers in Chicago.

The fall conference season arrived with a vengeance two weeks ago with those four major conferences overlapping as well as several other smaller shows.

All of the shows are valuable; they are meeting grounds for professionals to exchange views and ideas. But they shouldn't all come at once — many MIS managers have duties that span several interest areas and would benefit by being able to attend more than one show.

The American Federation of Information Processing Societies (Afips) maintains a list of scheduled events in the computer community. All show organizers should try to keep duplication to a minimum.

With that in mind, here are some thoughts on two of the recent shows and their contents:

• **Software Info.** For years the marketers of software products have felt they needed a special show to promote their wares — a show where they did not have to compete with the flashy hardware — and hardware exhibits found at such gatherings as the National Computer Conference.

Infosystems magazine has obliged with the Software Info show, and the first edition was a great success from both the exhibitors' and attendees' point of view.

Less flashy and more straightforward exhibits marked the show part of the event, and most of the industry leaders were on hand to pontificate.

But while the show was clearly a success for a first effort, the sponsors need to provide more promotion for future gatherings — and perhaps more emphasis on down-to-earth topics rather than industry prognosticating at its major sessions.

All in all, though, this is a show that will be around and one from which many MIS managers could benefit.

• **Annual SMIS Conference.** The Annual Society for Management Information Systems (SMIS) Conference also deserves note.

This conference is not a newcomer; this fall's was its 12th edition. The meeting is strictly a conference without the distraction of an exhibit and offers MIS managers a chance to discuss common goals and strategies.

The conference is an excellent forum for such an exchange, but most of the discussions do focus on global issues facing information systems and services executives. It would be improved with a dose — but just a dose — of practial advice on the day-to-day production processes that are needed to implement the global plan.

It is another event to put on your agenda for next year.

Hopefully there won't be five or six conferences competing for your attention — and travel dollar — during the same week.



'Not bad — except for a couple of issues where the other side of his mouth is still silent.'

LETTERS

Scratching the Surface

In case you were not aware, *Computerworld* may be falling short in its coverage of the IBM 3800 TNF controversy. The parade of dramatic headlines, articles, interviews and opinion polls has merely scratched the surface of this story's potential.

True, you have the alarmists frothing at the mouth, but don't stop there. Your fascination with the subject notwithstanding, you could be doing us a great disservice by not exploring even deeper into avenues of extracting additional mileage from the issue.

I mean, overkill is all well and good, but what becomes of us readers, come the inevitable letdown — when you run out of angles from which to pound it into the ground? I bet that with a little extra effort in the Sensationalism Dept., you could jockey this story to horizons beyond our wildest dreams — maybe even drag it out another six months!

Jennifer Summerlin
Buzzards Bay, Mass.

Australian Venture

The article "IBM Venture Spawns SBS Clone Down Under" in the Sept. 15 issue misinformed readers about the nature and purpose of Business Telecommunications Services Pty. Ltd. (BTS) in Australia.

BTS is a research company formed by 11 large DP users, including IBM Australia, all of whom have a strong interest in defining the long-term telecommunications needs of Australian business. It will provide the members with research and consulting services to explore the requirements for advanced telecommunications services.

There is growing recognition in Australia of the need for more interaction between government and industry on this question. Results of the BTS research will enable the participants to contribute more effectively to that dialogue.

A cooperative entity with an anticipated life of some 18 months, BTS in no way resembles Satellite Business Systems, a common carrier which will provide communications services directly to users.

Arnold Lerner
Director of Communications
IBM World Trade Americas/-
Far East Corp.
N. Tarrytown, N.Y.

Intimidating Tactics

The editorial "Standards for Avarice" [CW, Sept. 1], regarding IBM's alleged use of intimidating tactics against customers who ordered peripheral equipment from plug-compatible manufacturers, was of particular interest to us because, in connection with our federal antitrust monopoly lawsuit against IBM, we intended to present to the jury considerable evidence of such unfair marketing practices on the part of IBM.

We found plenty of cases where such intimidating tactics were said to have been employed, but the irony was, as was so correctly pointed out in the editorial, the individuals involved were reluctant to testify against IBM because they feared the result would be certain further retribution from IBM.

We expect to have the opportunity to retry our lawsuit against IBM and would be pleased to hear from any CW readers who were deterred from ordering products from Memorex because of the use of intimidating tactics against them by IBM employees. Letters should be addressed to me at San Tomas at Central Expressway, M/S 12-33, Santa Clara, Calif. 95052.

Foster A. Markolf
Counsel
Memorex Corp.
Santa Clara, Calif.

DATA PAST

Five Years Ago
Oct. 15, 1975

TULSA, Okla. — Telex negotiated a settlement of its antitrust suit against IBM just 72 hours before the Supreme Court was to hand down its decision on whether it would hear the case. The settlement called for no payments of any kind between the parties. IBM released Telex from an obligation to pay $18.5 million as the result of IBM's countersuit on trade secret charges, and Telex agreed not to pursue its antitrust claims.

Five Years Ago
Oct. 11, 1972

PARK RIDGE, Ill. — A Computer Foundation to promote and develop personnel certification programs for all computer users was under discussion by two major societies in the computer community. The Data Processing Management Association and the Association for Computing Machinery were jointly sponsoring the initial development to outline the charter and structure of the proposed Computer Foundation.

THE TAYLOR REPORT Alan Taylor

Questioned Benchmarks: An Issue of Trust

Benchmarks are easy to falsify in the same way that demonstrations are. The people running the benchmark may not know that anything is wrong; the changes often crop up in the salesman's description. Still, benchmarks can be very persuasive, as Robert G. Baker Jr. of Saginaw, Mich. can testify.

Baker is now looking for two former Data General Corp. employees who are thought to have run a benchmark using some of Baker's IBM System/3 RPG programs on a DG Eclipse, back in 1975. The two are Paul Fassbender, formerly of Westboro, Mass., and Richard Cook, formerly of Stow, Mass.

Baker's company is suing for damages for breach of contract by DG. A benchmark was used to convince Baker, according to papers on file in the court, that the 1975 Eclipse RPG was totally compatible with IBM System/3 source programs — and also that it ran 10 times faster for some situations.

While it was being processed, Baker signed a contract with a standard boilerplate-type clause disclaiming any warranty of merchantability on an Eclipse that DG would deliver in 1976. The disclaimer was buried in many pages of material. Another clause stated that the laws of Massachusetts would control.

Objection to Clause

It so happens that the laws of Massachusetts don't normally permit vendors to hide such widespread and important disclaimers — as U.S. Judge James Harvey recently pointed out when DG tried to have Baker's claim on this ground dismissed. So when you see one of those clauses setting the law, don't think it is unimportant.

Baker says that when the 1976 Eclipse system was delivered, the program wouldn't work as the benchmark indicated. Indeed, it later took months to get anything out, and Baker lost his clients and was eventually sued by DG for nonpayment. This is not an unusual story in our industry, unfortunately.

Having some technical background, Baker just cannot see how, if the software was able to handle the System/3 program in 1975, it couldn't do the same in 1976. The times Baker thought that benchmark took now seem impossible to him, assuming that they ran on the hardware model DG delivered to him.

I have to agree that Baker has a real question here. Computers nowadays are not built as they were in the '50s and '60s, and the label on the outside is little evidence as to what is under the covers. Printed lines giving time data can also be misleading. Benchmarks rely upon trust and this reliance is something the laws of this country try to protect. However, some vendors would like buyers to forget that.

Baker's Suspicions

Baker suspects there was some manipulation of the compiler to make it accept his program, or of the hardware to make it run faster, or both. And to try to find out what happened in time for the trial, he wants Fassbender and Cook to be located. (Any information on how to reach the two is being sought by D.A. Wilson of the law firm Van Benschoten, Hurlburt and Van Benschoten, P.O. Box 1837, Saginaw, Mich., (517) 790-3222.) Apparently DG does not know their whereabouts either, although they have been included on DG's witness list, Wilson tells me.

It is more important that the facts be made known so that Baker's suspicions can be proved or else set to rest and DG cleared.

But what is the importance of this story to users in general?

Many computer sales are based on trust between technicians, and system performance is described and represented by salesmen. The industrywide belief that this trust was being abused by the computer vendors and that the abuse was then more or less successfully hidden by legal tactics (which themselves might be improper) is gaining more and more support from court actions covering 1970s cases.

The Baker/DG case shows how this might work, technically, and (through Judge Harvey's order) how improper legal tactics can be both tried and caught out.

It may not be just the great big firms that are involved, as is sometimes argued, but improper marketing may be operating generally! And the problem

(Continued on Page 52)

READER COMMENTARY/Agnes M. Love

Managers Could Tap 'New' Personnel Source

In "The Personnel Crunch" [CW, Sept. 15], Harold S. Bott stated, "Many older women, having reared their families, will reenter the workforce. These woman often will have college degrees, but in fields other than those in which they choose to reenter."

Most of us completing a career in parenthood do not look upon ourselves as "reentering" the workforce, but rather embarking on another career.

College-educated women look upon the years spent at home as a total career — one of projection, execution and finally completion. We would have been foolhardy not to recognize that change and growth *are* life and we are part of that process.

Working with a career consultant to define my goals for the next 20 years, I have become appalled with the emphasis placed upon personal packaging, presentation, method and so forth.

I am not a stranger to the media world, having worked in advertising and public relations before my marriage. However, I am overwhelmed by the deification of personal stylists, social scientists, career counselors and personnel people — while content is almost totally ignored!

I also see discouraging indications in the data processing field:

1. A lack of foresight on the part of managers who fail to recognize the ultimate edge to be gained by reassigning some DP personnel for educational purposes (capable people are waiting to be trained!).

2. A lack of foresight on the part of employees, who are complacent in their jobs (with low productivity and company loyalty). The ultimate answer here may very well be displacement by their very own creations.

Many of us are waiting to get "in," and we are educated, intelligent, accomplished and enthusiastic.

There is enormous resistance to accepting the inexperienced — regardless of desire, intent and commitment — but I believe a virtual army of women exists who would gladly sign contracts with companies in exchange for training and education.

The first company that will open its doors in this way will reap tremendous rewards!

HUMAN CONNECTION/Jack Stone

Attitudes Make Difference to End Users

Have you ever had the opportunity to play the role of an end user and experience, firsthand, how DPers relate to you?

If you haven't, you really ought to try it — it may just be a wild eye-opener. Recently I did — and it was. I want to first describe the incident, then give some of my impressions about the DPer involved and make several observations.

I happened to be studying a custom, on-line system as part of a writing project. After some time at the terminal, I had figured out how to access and update the master file, but I couldn't get myself out without losing the input data. By luck, the software developer happened to appear on the scene; so I introduced myself and asked for a few minutes of his time to resolve my problem. (I should note that I didn't mention my two decades of DP experience, and he didn't ask.)

His response was certainly a cooperative one because he said he had been around the terminal room for a while doing some system chores and would be pleased to assist me. "All you have to do is ask," he commented. So after waiting a polite three minutes or so, I went over to ask my question on how to get out of file update mode, and this is what happened:

A stream of verbiage poured out of his mouth, and it came so fast and furious that I didn't have the remotest idea of what he was saying. Since there was no way I was going to suffer the embarrassment of requesting a retransmission, I thanked him instead, returned to my terminal, restarted my system and hoped that I could find some answer on my own. (It dawned on me that I was dealing with a DPer cloned from the traditional technical mold.)

Somehow I stumbled onto a combination of control keys that got me out, so I went back in again. This time the system asked me to supply a code number which I didn't know, so I put in a bunch of different ones, hoping to get past the field. But the system wouldn't let me, so I trundled over to my leader a second time and asked if he knew the bypass code.

This time he told me to check the documentation. Of course, I didn't have a copy with me and there wasn't any in sight. So I gave up on the master file and decided to check out a secondary file. I recalled that the file entry sequence was a little complicated, and as you might have guessed, I got stuck. My mentor walked by at that moment, and I asked if he could get me going.

With what I perceived to be a supercilious and disdainful smirk, he flashed his hand across the keyboard and socko! I was in the right screen. Naturally, he went so quickly that I couldn't follow the sequence of events. I left the room a few minutes later and the next day decided to give up the project.

I certainly had no reason to doubt the developer's technical competence; I would expect that an experienced operator, after a little training, would be able to handle the terminal just fine. However, I had every reason to doubt the developer's effectiveness, because he was so completely oblivious to the fundamental precepts of human communication.

Although I grant that he was sincere in offering to help me bungle through the system operation, his actions conveyed a spirit of arrogance and superiority. And all I wanted was the answer to a few questions.

Of course, I'm not saying that all the old-line DPers are that bleak in their user relationships, nor am I saying that the new-line M.B.A.s are technical heros. But what is to be learned from this story — and verified by many, many end users — is this: The attitudes, sensitivities and common-sense business communications are what impress end users about DPers, not their technical competencies.

LETTERS

On 'Twin Myths'

I must take some exceptions to the article "Structured Coding's Twin Myths" by Peter Lacey [CW, Sept. 8].

On his first point, Lacey presumes that all programs and their subunits can be broken into initialize, process and terminate phases and that the processing phase is always at least one loop.

A real-time program might well have no termination at all. (Ever get a terminated run from your operating system? Did you like it?) Interactive programs can mix the process of checking a user response to a prompt with the initialization of the variable. Further, a null module is quite possible in a set of conditional statements; a mathematics major would consider "doing nothing," but most people would not view this as a process.

Lacey then implied that PERFORM verbs are the way to write structured code in Cobol. The current wisdom of Yourdon et al is that the CALL verb should be used, since the goal of structured code is to isolate the variables from any global effects. In Algol, PL/I or Pascal, this can be done with local declarations; in Cobol (like Pascal), this must be done with procedure calls. Investigations show that the DATA DIVISION is the most error-prone.

The lack of GOTOs in the block structured languages, where structured programming began, was a way of forcing one entry and one exit point in the flow between modules.

The lack of GOTOs for the sake of readability is a bit debatable. I have the feeling that GOTO-less programs are easy to read because anyone who was trained to think that way can pick it up and have no adjustment to make to the style of the original programmer. You can also transform a GOTO-less program to reverse the logic in the IF-THEN-ELSE statements and so forth to make it look more like "a program I would have written."

The nested IFs are a bother. They are generally the result of (1) not having a Case statement in the language, (2) not having a programmer who knows enough Boolean Algebra to reduce the depth of nesting or simplify the expressions or (3) tack-it-on-the-end style maintenance procedures. No one seems to teach decision tables any more and they are really needed. Maybe *Computerworld* could do an In Depth article on this lost art form.

I really feel that Lacey's dislike of the GOTO-less code is due more to the language (Cobol) than to the practice itself. Algol and Pascal people tend never to use their GOTOs simply because they have enough control structures to clearly do the job.

A further advantage is that GOTO-less code can be optimized by fairly simple algebraic transforms inside a compiler or at the source code level.

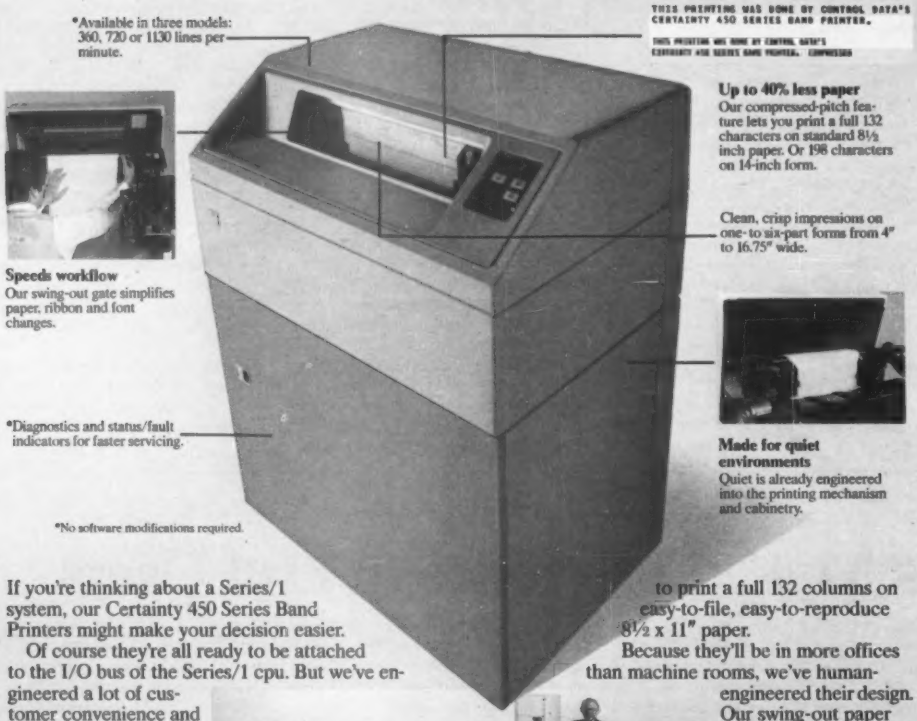
Lacey's remarks on planning are very much on target. I have worked in too many places with a "code first, design later" approach. My point is that planning can make even Cobol with GOTOs work better than any language without any planning at all.

Joe Celko

Atlanta, Ga.

Print faster and save money

Attach your Series/1 to Control Data Band Printers



If you're thinking about a Series/1 system, our Certainty 450 Series Band Printers might make your decision easier.

Of course they're all ready to be attached to the I/O bus of the Series/1 cpu. But we've engineered a lot of customer convenience and versatility into their design to give you a lot more than a basic printer for your money.

Three models to give you a wide range of printing speeds, for example. Up to 1130 lines per minute. And both our 360 and 720 lpm printers have a compressed pitch feature. Besides saving paper, this permits you to print a full 132 columns on easy-to-file, easy-to-reproduce 8½ x 11" paper.

Because they'll be in more offices than machine rooms, we've human-engineered their design. Our swing-out paper gate simplifies forms loading and ribbon changes. Even print bands can be changed in seconds.

You won't have to worry about service, either. More than 4800 Customer Engineers in our worldwide maintenance organization support our products.

Available Now

Our Band Printer is ready to help you get optimum performance from your Series/1. For data sheets and more information, call today, toll free. 800/328-3390.

CONTROL DATA CORPORATION

Addressing society's major unmet needs

Focus on Maintenance

Congratulations for publishing the In Depth article "Attacking Maintenance Costs" by Larry M. Singer [CW, Sept. 8]. The focus in the 1980s (and perhaps the '90s also) will be on software, and the high cost of software maintenance is in the spotlight. The article made DP managers aware of the maintenance problem and offered some solutions worth considering.

I woud like to comment on two points:

1. Programmer participation will be invaluable in the design of time activity reports and personal logs. Welcoming their feedback would also encourage them to collect accurate data.

2. The possible correlation between high maintenance activity and programmer turnover is worth studying.

Such In Depth articles provide valuable guidelines for managers as well as technicians. I hope *Computerworld* will also publish some case studies of reducing (or increasing) maintenance costs in the future.

Girish Parikh

Chicago, Ill.

LETTERS

Passing the Word

"Suit Filed Against Worker for Erasing Programs" [CW, Sept. 8] stated, "Checking the computer's log ... Leeds & Northrup people learned that Hershman had entered the system." It would be more accurate to say that the log indicated Hershman's access privileges had been used to enter the system; one might allege that Hershman was in fact the user. For the time being, we are not our passwords.

Richard L. Kleir
Berkeley, Calif.

Using Athletic System?

We are interested in locating an athletic system that can handle multiple citywide events, multiple leagues, multiple locations and multiple games per day at each location.

We will be replacing our Burroughs Corp. B3700 computer system and installing a B3950 during the first quarter of 1981.

Although we prefer a system operating on a Burroughs medium system, we would like to talk with anyone having such a scheduling system in operation.

Robert W. Crow
Assistant Director of Data Services
City of Tallahassee
Tallahassee, Fla.

Graphics at Harvard

In regard to the Aug. 18 article "Graphic Week '80 Draws Few Exhibitors," please note that Harvard Computer Graphics Week is not a hardware show and that all space allocated for exhibits was sold out weeks before the conference. The Cambridge Hyatt Regency Hotel has limited exhibition facilities, hence only a select number of vendors whose products and services are directly applicable to computer graphics are invited to exhibit. Instead, we place primary emphasis on developing informative and stimulating sessions.

Second, the article failed to mention many of our exhibitors such as ABT Associates, Houston Instrument (which is *not* part of Trilog), J&J Associates (sales representatives for Intelligent Systems, Soltec and Trilog — all of which were represented at the show), Polaroid and Tektronix, Inc. In addition to the exhibits, Summagraphics Corp. hosted a hospitality night which included new equipment demonstrations.

Third, Prime Computer, Inc. was not an official exhibitor, although a Prime computer was used in conjunction with the Xerox display.

Lorrie Irish
Exhibits Coordinator
Laboratory for Computer Graphics and Spatial Analysis
Graduate School of Design
Harvard University
Cambridge, Mass.

More on Free-Lancers

As a member of the Independent Computer Consultants Association (ICCA) and as an individual who has been effectively a self-employed contract programmer for several years, I am disturbed by the article "Managers Warned of Contract Programmers" [CW, Aug. 18]. I am not actually concerned that such an article will affect the contract programming field adversely, but I am surprised that such weak, unbased and probably erroneous criticisms would be made by the president of a firm presumably trying to sell such services.

Of course, one should always exercise caution when hiring any person to work on their staff, but I believe that to add the word "extreme" or to say that it is "somewhat like struggling to find a lost object in the dark" is not saying much for the judgment of the managers themselves. Any manager who cannot evaluate a contract programmer or check references on him or her won't have much better success in hiring employees.

As far as the loyalty of a free-lancer vs. a permanent employee goes, I would like to leave that to the manager who has seen his employees jump to other companies or perhaps hired one away with a salary increase. As a general rule, I feel that the employee who announces that he is leaving in two weeks is more apt to leave without writing that document that he was going to have ready when he had time between projects and fires than the contract programmer who has an express responsibility to provide that documentation within the period of the contract.

If a contract programmer regards repeat customers as his bread and butter, I doubt that he will cut any corners, let alone as many as the overworked employee next to him or the person from the contract services firm whose company is responsible for securing his next job.

Obviously the nuances of each firm's procedures would be a consideration in employing an outsider for short-term help. However, many contract programmers are seasoned in adapting quickly to new environments.

Any person who wants to get a task done in a "foreign" environment knows that it is important to be accepted by the other members of the team he works with. Self-employed programmers who "stir up staff resentments" or contribute to staff turnover in any way should be dealt with immediately.

I challenge Al Strong to tell us the arguments he uses to sell his services; perhaps his customers should also heed the adage, "Let the buyer beware," as well.

Richard J. Tett
Software Support International, Inc.
Shoreview, Minn.

CUT THIS COUPON

UPS BLUE LABEL AIR D
51 Weaver Street, Greenwich, CT 06830

Okay, I've cut the coupon. Now prove to me how Blue Label Air is a cut above the expensive delivery methods I'm currently using. Send me the facts.

Name & Title

Company

Address City State Zip

and cut the high cost of air delivery up to 70%

It's time to save money. A lot of money. It's time to discover UPS Blue Label Air. The quick, dependable, low-cost alternative to overnight air delivery. Now, more than ever.

The concept behind Blue Label Air is simple: we take one additional business day to jet-deliver shipments almost anywhere in the country. In return, we promise savings that will make you think twice about requesting our high priced competition for anything but true emergency situations. For example, a 10-pound package shipped between Boston and Los Angeles by overnight air averages $36.48.* The same package delivered on the second business day by Blue Label Air costs just $10.51!* And this unbeatable price includes door-to-door service. Plus a tradition of UPS reliability and courtesy that reaches back more than 70 years.

*Rates in effect 7/80

UPS shippers receive automatic daily pickup service for a nominal weekly charge.

UPS BLUE LABEL AIR

The money-saving two-day alternative.

UPS

LETTERS

Poor Results

Al Volpe's experience does not in any way detract from the utility of structured programming ["A Worst Case Example," CW, Sept. 1]. It does, however, point out quite clearly that a poor program can be designed and produced in spite of the excellence of the design philosophy.

His model of "controlled loop logic" is in fact an example of one way to implement the "Case statement" construct in Cobol. The Case construct was invented for use in precisely these circumstances and generally solves the problem of deeply nested IFs.

Surely structured programming is as much an attitude and a refined approach to problem solving as it is a methodology for producing source code, and I feel quite strongly that its detractors must argue against the tenets of structured programming if these detractors are to be taken seriously. These tenets, I might add, do not stop at the prohibition of "GO-TO" statements in a program.

Finally, let me say that I have sympathy for Volpe. The inheritance of a monster program is not a joyous event. However, whether it is a structured monster or just a plain monster in no way establishes or reflects the claims of either school of thought.

J.S. Bond

Toronto, Ont.

Means Vs. the End

The accounting system described in "Structured Methods: A Worst Case" certainly qualifies as a worst case, but not as far as structured methodology is concerned. It is, in fact, a perfect example of the kind of software that results from confusing the means of obtaining structure with the end, that is, a structured program.

The various "rules" that make up the structured approach to software development, such as no GOTOs, exist only as the means of producing a desirable end product, namely, a program that gets written quickly, is robust and, if necessary, easy to modify. Because of the "rules," the structured approach is often depicted as a black box that automatically cranks out wonderful software. Unfortunately, this is not the case and the idea that by eliminating GOTOs one can produce structured software is ludicrous. You cannot dissect out one small part of the system and expect it to function like the whole.

Effort, ingenuity and a clear idea of what good software looks like must exist hand in hand with structured methodology in order to produce a structured program.

Structured methods *can* work wonders, only if approached in the right perspective. To paraphrase Alexander Pope:

"A little structure is a dang'rous thing,
Drink deep, or taste not . . ."

William A. Stafford

New Brunswick, N.J.

Laughter or Tears?

One hardly knows whether to laugh or cry after reading "Worst Case Example", a confused entry in *Computerworld's* series on structured methods. Technical specialist Al Volpe railed against structured programming, which he fuzzily supposed to prohibit GOTOs and mandate IF nesting. How did he know this? "Everyone I've ever worked with takes the position that in order to have a structured program you have to get to nested IFs." The only thing this remarkable statement would appear to prove is that in a closed system, ignorance is conserved as well as matter and energy.

The genuine irony came next when Volpe suggests a strategy of program construction using hierarchies of PERFORMed paragraph pairs with the second of each pair being just an EXIT. Don't look now Al, but *you* — yes *you* — seem to be a structured programmer without knowing it. Check the guidelines for structured Cobol in an appendix of the book "Managing the Structured Techniques" by Ed Yourdon (Mr. Structured himself). Any resemblance to your preferred coding style is strictly structured.

No mention was made of whether or not the 6,000-line "structured" program Volpe tangled with used PERFORMed paragraphs in a sensible way or even at all. If it did not, I submit that the author was in no sense an author of structured programs, he just had a fetish for nesting IFs.

Volpe is quite right in opposing excessive IF nesting in Cobol as the Cobol IF is "crippled" relative to the IFs the structured programming theorists usually refer to. Cobol IFs nest "in" well enough, but they don't always "un-nest" back out gracefully as one can't terminate an inner IF without terminating any outer IFs in the nest as well. Sensible structured Cobol actually *requires* GOTOs (forward only) to preserve logic clarity in a lot of cases.

The pseudocode example supplied appeared somewhat at odds with the sentiments expressed by Volpe in the text and with the accompanying caption. Reference was made to an AT END check, for example, but no READ was shown.

At the five-story mark in the "Structured Methods: Pro and Con" series, I make it four successes (one with a misleading headline) and one nonsequitur. It's going to be interesting to see whether the CW staff can actually find a bonafide structured flopperoo to write about. I would also welcome any comments Volpe would care to make, as the somewhat murky style with which CW rendered his story may well have garbled some of his intent.

Richard Eagleson

Los Angeles, Calif.



The Power Management Center
generates savings!

100% effective conditioning eliminates costly computer error, program damage and downtime caused by power fluctuations. Flexible plug-in distribution cables replace expensive rigid conduit electrical systems.

Installation expense is minimal and maintenance costs are practically non-existent! And, growth possibilities are unlimited!

Start saving now - call or write Conditioned Power, 1050 Dearborn Drive, P.O. Box 29186, Columbus, Ohio 43229 (614) 888-0246

Conditioned Power
subsidiary of Liebert

Put FiQUENCH® Between You & Disaster.

FiQUENCH® Halon 1301 Fire Extinguishing Systems Are Modular Pre-Engineered Systems That Offer:

1. Automatic detection and extinguishment of fires.
2. A safe, clean, and effective extinguishing agent.
3. Installation costs that are substantially less than piped, central storage systems.
4. Ideal protection for computer rooms, record storage areas, switching stations, power stations, and other complex operations.

FiQUENCH Systems are now U.L. and U.L.C. listed and F.M. approved. For a free brochure and the name of your local FiQUENCH representative, write or call:

FiQUENCH
Fike Metal Products Corp.
704 South 10th Street
Blue Springs, Missouri 64015
816-229-3405



User Questions Benchmark

(Continued from Page 49)

may well be a technical one, stemming from computer technology rather than from monopoly powers, as is often argued.

This new case indicates the possible depth of the problem and may also indicate the way ahead for users and vendors alike.

The future of the American computer industry worldwide depends upon the quality of its products, rather than any successful defense of overselling by U.S. lawyers. Unless we want the industry to go the way of the American auto industry (remember how difficult those car manufacturers made it to recover on a lemon — and what happened to quality?), vendors must start planning for, and backing up, quality delivery.

Terms such as LFE's 98% uptime guarantee [Taylor Report, Sept. 22] should replace the standard, perhaps illegal, disclaimers.

If we don't stand behind quality, someone else will.

© Copyright 1980 Alan Taylor. Reproduction for commercial purposes requires written permission. Limited numbers of copies for noncommercial purposes may be made provided they carry this copyright notice. The views expressed in this column do not necessarily reflect those of Computerworld.



'Our Computer's on the Blink, but I'll Take a Shot in the Dark — It Could Be Gall Stones.'

The Romans had it.



The British had it.



And now, by George... ADR's got it.

EMPIRE™

The most powerful and complete decision support system available.

For DEC 10, 20, VAX and IBM MVS/TSO, VM/CMS

EMPIRE puts the power of the computer at the fingertips of the decision maker. Its comprehensive yet easy to use collection of interactive facilities for data management, reporting, graphics, statistical analysis, and alternative outcome simulation enables executives without computer expertise to examine an unlimited number of strategies in any planning situation. EMPIRE allows you to keep your confidential financial information in-house and reduce outside time-sharing expenses.

EMPIRE was developed by ADR, the world's largest independent software company. ADR has installed over 10,000 of its software products at more than 6,000 sites worldwide. EMPIRE incorporates the qualities ADR traditionally builds into its software: ease of use, efficiency, dependability, and total commitment to product support. Now your decision makers can have an EMPIRE. With confidence, by George. Send for a brochure today.



APPLIED DATA RESEARCH, INC.

Attn: EMPIRE Information Center, Route 206 Center, CN-8
Princeton, New Jersey 08540, Telephone: (201) 874-9000

CRT 360° TURNTABLE



Complete Swivel Allows Shared Access

This turntable is one of MISCO's best values — and could be one of your best investments. Capable of supporting over 300 lbs., turntable can accommodate even the largest terminals on stable, spacious 18" x 24" surface. Entire unit raises CRT less than 1". Walnut grain finish top, no-mar swivel base.

MISCO 1573 ..... **$46.00** ea.
3 or more **$42.00** ea.

CUSTOM-FIT COVERS



- Durable, heavy gauge vinyl
- All seams sewn & double reinforced
- Keeps out dust, dirt, contaminants
- Saves on maintenance costs
- Precise fit for attractive appearance

Select Custom-Fit Cover From Chart Below

MISCO	Terminal/Printer
1910	Hazeltine 1400, 1500
1911	ADDS-Regent 100, 200, 300
1912	Lear Siegler — ADM
1913	Teletype 43
1914	TI 911 Video Display
1915	Qume Sprint 5 w/o keyboard
1916	NEC Spinwriter w/o keyboard
1917	TI-810
1918	DEC LA34 w/o Tractor Feed
1919	DEC LA-30, LA120, LS180
1920	DEC LA-36
1921	Centronics 779, 780
1922	Centronics 101, 102, 103
1923	Qantel 4012

Mix or Match Covers For Quantity Pricing
1-2 **$10.95** ea. 3-5 **$10.50** ea.
6 or more **$9.95** ea.

Large Quantities? Write or call our Customer Service Dept. (201) 946-3500 for quote on your specific models

Shipping and Applicable Taxes Additional.

3 Easy Ways To Order

CALL: 800-631-2227
In NJ call (201) 946-3500

TWX: 710-722-4901

MAIL: PO Box 399, Holmdel, New Jersey 07733 USA

FREE CATALOG More Good Products From MISCO



Call: (201) 946-3500
Write: Box 399, Holmdel, NJ 07733

Call Us. We're The Answer
MISCO INC.
The Minicomputer Supplies Co.
Holmdel, NJ. USA

READER COMMENTARY/Harold Gluck

Security More Than Secret Code

Frank E. Vescio, former Commissioner of Public Safety of Yonkers, N.Y., is an expert in the field of security. He was my boss during his tenure of office. This is what he had to say for your consideration:

"We are approaching an era in business where everything will soon depend upon computer technology. That means that in order to protect your business, you have to give the computer complete protection.

"But the idea of complete protection demands that you know just what it is to be protected," he said. Here are the situations he suggested taking into account:

• *Burglary protection.* The computer and its components can be sold on the black market. An expert gang can rip out the computer within a matter of minutes and load it into a waiting panel truck or even into a large 18-wheeler.

That means that in addition to the electronic devices for the business and the specific area, there should be special protective devices for the computer area and the computer itself. Under the best conditions there should be a computer room. If this is not possible, then the computer should be in a section whereby entrance cannot be obtained by breaking through the wall section.

Infrared as well as vibration detection units should be used for protection. Under ideal conditions, closed circuit television should be connected to police headquarters or a security responding service or monitored by a hired guard.

Entrance to the place of business by burglars may be through the front door. It must have a strong bolt lock with a pick-resistant cylinder. The door should be strong enough to resist brute force trying to push it open. And the door itself has to be set in a good frame. A face plate can be added to protect the cylinder.

• *Fire protection.* The top emergency fire-fighting apparatus should be in the computer area. But in use, it may also damage the computer. And if there is a sprinkler system, that too may wreak havoc with computer equipment. Consider the use of portable asbestos shields or blankets to protect the equipment itself.

It is simplest to say that prevention is best here. That means a constant check on situations that can cause a fire inside the area and that includes the smoldering cigarette in the trash basket to a faulty electrical connection.

• *Vandalism.* It is also known as sabotage. Internal vandalism may be caused by a disgruntled employee who wants to hit back at his employers. He may wipe out very important data or may even substitute other data for the original data.

You must control access to the computer area. If it is within its own housing, that makes it simple. If the computer area is connected openly with the rest of the business section, there should be a setup so that only those who have to use it can get to it. You may even have to block off the surrounding area.

• *Blackout.* It happened in one of the leading cities in this country, and looting took place almost unchecked. The blackout can be the result of a power failure or a malfunction of an important portion of the electric power setup. It might also be deliberately caused to enable looting, vandalism and other objectives to take place.

'The computer has been given the list of all customers. This makes it nice and easy to send out specials for a forthcoming sale. But that list of customers is worth money in the right market.'

Contingency plans are needed for this possibility. You have to consider the use of attack dogs as well as the use of chemical sprays. You need a list of people you can count on to help you. If the phone system is also out, then you have to look ahead and use CB battery-powered communication.

You should also consider having a small emergency generator ready for use in this situation, along with a supply of battery-powered "bright light" equipment.

• *White collar crime.* You keep your inventory control on the computer. Wonderful! But the "computer criminal" in your firm is trying to figure out how to change the inventory records. Once done, stealing becomes easy, and you may never realize what took place unless they become too greedy.

The computer has been given the list of all customers. This makes it nice and easy to send out specials for a forthcoming sale. But that list of customers is worth money in the right market. And you may never know that a trusted clerk got the record of it and sold it for a nice sum of money.

And accounting procedures are now handled by the computer. A hard-working but crooked bookkeeper could slip in several fictitious accounts that get paid regularly every month. He can even erase and change the amounts due from debtors and get paid for that bit of larceny.

From time to time there must be independent checks on data used by the computer — for example, by picking at random three names of companies to which money is owed for services or merchandise. What merchandise? When was it delivered? Who used it?

• *Ransom demands.* We are waking up to the fact that kidnapping for ransom has already come to this country. You have to look ahead to this possibility — but you may not be the one who is kidnapped!

Important tapes are missing. Then comes a call asking for a sum of money for the return of those tapes. How did they vanish in the first place? Could anyone inside do this during a lunch break? Was a substitution made? If it happens to you — notify the authorities at once!

• *Disaster planning.* Would you be able to state now what possible disasters — flood, snowstorms, raging forest fire spreading into town or even an earthquake — could hit your area? If the computer were severely damaged and the primary sources wiped out, how would you function?

The idea of a depository in another area where duplicates can be safely stored has to be considered. This should now be taken into your calculations. I know, you may never have anticipated that a tornado could hit your area. But it did! Were you prepared for it?

From a practical business viewpoint, the entire computer setup may be more valuable than diamonds. And it does demand even more protection than that set up for diamonds.

Gluck is an attorney and criminologist based in New York.

HAD IT WITH COAX?



Here's how the new LDC COAX ELIMINATOR™ can solve your 3270 cable problems:

- Enables connection of up to 8 LDC SOFTPRINT™ Displays* to one coax cable.
- Allows display attachment to a Remote or Local LDC Controller via a twisted wire circuit.
- Provides access to locations beyond 5,000 feet.

*The SOFTPRINT Display incorporates features of the IBM 3278—2, 4 & 5.

Call Our System Specialists
800-328-3998

10206 Crosstown Circle
Minneapolis, MN 55344
(612) 932-0300

LDC
LEE DATA CORPORATION

We simplify with better solutions.

IBM invites you on a journey through time.

The IBM 5520 Administrative System. We call it our time machine. Because it shatters the time it takes to do business.

Once upon a time, just getting a document written and delivered across the hall seemed to take years. And to get it across the country? That seemed like light years.

But that was before the IBM 5520 Administrative System.

With the IBM 5520, time and distance need no longer get in the way of discussion and decision.

That's because the IBM 5520 can help compress time. For example, someone in your main office begins writing a document. Within minutes after it's completed, it can be edited, printed, and distributed electronically to branch offices coast to coast.



Need changes in an existing document? With the 5520, your secretary can make changes, additions and deletions in a fraction of the time retyping would take.

And in addition to word processing functions, the 5520 does arithmetic functions and has files processing capabilities, too.

The 5520 even files documents on diskettes. So you can retrieve them in no time at all.

Which not only saves you time, it saves you space. And makes it easy for you to make inserts from one document to another.

What's more, the 5520 is compatible with other IBM systems. It can interchange information with other 5520's and a wide range of IBM office products (including the new IBM Displaywriter) and appropriately programmed System/370 computers. Which means it can help you enhance the capabilities of other IBM office products you may already be using.

The IBM 5520 Administrative System. It helps you improve the flow of business information, putting it in the hands of people who need it, when they need it. And saving valuable time in the process.

For more information, call your General Systems Division representative or write us at P.O. Box 2068, Atlanta, GA 30301.

H.G. Wells' time machine was a fantasy. IBM's is a fact.

IBM
General Systems Division

The New Standard For PDP-11 Disk System Technology

Check with us before you buy, because we can beat all prices!



Know All the Hidden Costs

Only System Designed Just for PDP-11 Family
Designed exclusively for DEC's UNIBUS or MASSBUS CPU's. On the UNIBUS, it's just one card that plugs into any spare SPC slot. On the MASSBUS, four cards plug into any spare existing RH70 standard back plane.

Same Disk Drive as DEC RM02-03, RP06 and RM04-05
We use the same disk manufacturers as does DEC. The RM02-03 is the 9762 CDC 80MB and the new RM04-05 300MB is the CDC 9766. Only the LOGO is different.

Transparent to All DEC Software, Diagnostics and Drivers
You bet! Use your existing Software . . . no change needed. Runs all DEC's Diagnostics plus has its own. Fully emulates DEC disk Drivers.

Worldwide Installation and Maintenance
Through Data Systems Services, maintenance and installation is provided via CDC for both Drive and Controller. We also offer full PDP-11 system support.

Full Media Compatible?
That's right! You can read or write on our drives. Put it on DEC's and it will play or vice versa. TRULY MEDIA COMPATIBLE.

DRM02-3 80MB Slave	DRP06 200MB Slave
DRJM02 80MB + Controller	DRWP06 200MB + Controller
DRWM03 80MB + Controller	DTU45
DRJM04-5 300MB Slave	DTU77
DRJM04 300MB + Controller	DTU125
DRWM05 300MB + Controller	Line Printers
RJM07 600MB + Controller	Memories
RWM07 600MB + Controller	11/34 → 11/70, VAX
RM07 600MB Slave	Systems

OEM Discounts Available

(714) 770-8024

22642 Lambert, Suite 408
El Toro, CA 92630

DATA SYSTEMS SERVICES

PDP and DEC are registered trademarks of Digital Equipment Corporation.

SOCIOLOGY OF COMPUTING/ Robert L. Glass

Boom and Bust: A Sociological Trauma

I've known a lot of computing failure stories in my time. But I think this story contains the fastest boom and the fastest bust of any I can remember.

It all began at Fallout and Crosswind Nucleonics (F&C) in the late 1970s. Peter Proton, one of the up-and-coming F&C software engineers, was the key figure in the story. And the subject of the story was F&C's attempt to develop a generalized nuclear power plant control system.

Fallout and Crosswind had poured a great deal of time and technical talent into the control system for the Whiffenpoof, Wis., reactor. Not only had they done the predictably well-structured and modularized job of coding the control software, but both the hardware and the software were supported by a superior-to-the-state-of-the-art fault tolerance package. Redundant computer hardware units stood ready to take control if the software controller identified any hardware component malfunction; and the software monitored its own performance, with dual-coded modules available to be given control if needed.

Dual coding, if the term is new to you, is the act of programming two unique solutions to the same set of requirements, typically using two non-communicating teams. A software fault-tolerance system can then turn control over to the backup code if the foreground code produces measurably inconsistent results.

Not only was the F&C fault tolerance approach impeccable by contemporary standards, but the simulation support system was accurate down to a gnat's proverbial eyelash. Do you want to know the impact if three unlikely human errors are committed in a two-hour period (just to pull a hypothetical figure out of the air)? F&C's simulator could produce predictably consistent and apparently accurate results, to the nearest nanorem of fallout.

F&C's Fair-Haired Boy

Peter Proton was the architect of this elegance. He had designed the system, been chief programmer for the team which built it and written several papers on both fault tolerance and simulation techniques. When it came to software solutions, Peter was F&C's fair-haired boy.

It came as no surprise to anyone at F&C, when word spread that the government was looking for someone to design a general-purpose nuclear control system, Peter was put in charge of the F&C preproposal team. Rumor had it, from those sources who always seem to know those not-yet-known things, that a request for proposal (RFP) would be out in six months. Peter's job was to do the spadework necessary — the initial design confrontations, the tough problem analysis — so that when the RFP did come out, F&C would be in their Nikes and ready to run.

Peter's first problem was to pick a starting point. He could produce a whole new design, tailored to the generic problems; or he could start with the highly successful Whiffenpoof system and design generic modifications. He chose the latter — familiar ground always seems like safer ground.

The six months went by quickly for Peter. His preproposal efforts were a technical challenge, and that made it a good time; and there was no hard and fast schedule, which made it better.

As usual, the RFP had a short fuse. The proposal had to be written and delivered in nine weeks. The comfortable pace of the preproposal phase suddenly vanished.

F&C management did a quick back-of-the-envelope calculation and realized that to write a credible propsal would require a team of about 45 technologists!

Have you ever participated on a project where the manning curve was vertical? There's a feeling of societal severance; all of the normal ground rules are suspended until stability is reached. The ambitious move swiftly to carve out ever-increasing territory in the newly forming management hierarchy; the lazy vanish for hours at a time, with no one responsible for keeping them on the job; the meek hole up and wait for it all to blow over.

And so it was at F&C. Peter Proton's one-man band began to take on the attributes of uncontrolled chaos. Forty-four more people joined the team and Peter, used to leading no more than four or five, gave up trying to organize and holed up to read the newly arrived RFP.

It was in the midst of this already disastrous environment that Peter suffered another devastating blow. His whole predesign approach, you may recall, had been to modify the Whiffenpoof system. But as he turned the pages of the RFP, it became more and more painfully clear that a far more ambitious solution than Whiffenpoof was called for, one that required a start-from-scratch new design.

There were a lot of possible reactions Peter could have had. Stunned by this new and unpleasant turn of events, he chose one of the worst possible. He made the spur-of-the-moment decision to go with his original thorough but inappropriate predesign efforts and concentrate on the task of organizing people. And, gradually, he created a superficial order out of the chaos.

It wasn't until the proposal team was organized and given assignments that the truth began trickling out. Technologists who compared the RFP against Peter's technical assignments realized they were in mid-nowhere. The RFP and what they were asked to do were totally out of sync.

It was three weeks into the nine-week proposal effort that F&C upper management finally understood what was happening and pulled the plug. The 45 team members were scattered back to where they had come from and Peter, no longer the F&C fair-haired boy, did some time on the corporate carpet.

And to those of you who thought that boom and bust on a nuclear project had to do with physical explosion, I hope you are not disappointed to find instead a sociological one. For the 45 people on this project that failed, it was traumatic enough as it was.

LETTERS

Six of One . . .

Three cheers for the commentary "Structured Coding's Twin Myths." I have always believed that a program can be just as structured with GOTOs as with PERFORMs [CW, Sept. 8].

Lacey pointed out some things that programmers tend to overlook — every program, no matter how large, still has only three phases: initialization, processing and termination. Even the smallest loop, be it a GOTO or a PERFORM, has these same three phases.

The statement of Lacey's I was most happy to see concerned nested IFs. He said "nested IFs (which should be avoided like the plague in any programming method) . . ." are just multiple GOTO or PERFORM statements. I would much rather write a few more lines of easily understood code using two or three GOTO or PERFORM statements instead of one nested IF which looks like a foreign language.

Once again, thank you, Peter Lacey, for pointing out that half a dozen GOTOs are equal to six PERFORMS.

Roger A. Graves
Salt Lake City, Utah

Not for Money

Some time back, you printed an article in which you stated that money wasn't the most common reason that a DP person resigned from a job.

After being a programmer for 4-2/3 years and a systems analyst for all but 6 months remaining in my 7-1/2 year DP career, I agree with you.

I had the misfortune to have had a six-month assignment as a consultant. I had designed two systems, was heavy in IBM OS JCL, Cobol, Vsam and TSO-SPF and was highly regarded by previous companies.

At the consulting assignment, I was treated terribly. Whenever I asked a question, the answer was "Well, what do you think?" I was given no backup by my consulting firm and worked 60 to 80 hours each week in an assignment for which I was highly overqualified.

After six months, I had all I could take and submitted my resignation. I was pressured into staying on, but refused. No amount of money could have kept me. I find that many other people shared my experience at consulting firms and vow never again to work for one.

The second most common reason for resigning that I encountered involved working for a DP manager who either (1) wrote a Cobol program at one time and now feels he knows everything about DP, or (2) a DP manager who knows nothing about DP.

In both cases, the manager would insist on impractical ideas and could not be talked out of them. Other times, ridiculous schedules would be imposed.

I firmly believe that a DP manager should have DP knowledge. I certainly don't expect the manager to be the best coder or have the highest technical skills in the shop, but I do believe that DP management should have DP knowledge to be able to impose practical suggestions, set workable time frames and be able to say "No" to a user when necessary.

Ken Mitchell
Newburgh, N.Y.

New way to exert more control.



Now you can get business graphics in a simple, smart display terminal.

Regent 30, the newest terminal from ADDS, offers a full upper and lower case display and keyboard, cursor control and editing keys, and transmission capability by character, line, or page.

Our patented business graphics let you make bar charts, graphs, histograms–provide a resolution of over 11,500 graphic elements to depict financial or other data.

And with all this extra visual control, the *Regent* 30 is priced so you can control costs.

For more information and the name of your nearest distributor write: Displays Division, Applied Digital Data Systems Inc., 100 Marcus Blvd., Hauppauge, N.Y. 11787. Or call (516) 231-5400.

See us at INTERFACE WEST, Booth 1131.

ADDS TERMINALS

SOMETHING EXTRA IN EVERYTHING WE DO

ADDS DISTRIBUTORS FROM COAST-TO-COAST

***NATIONAL**

General Electric ASBD
Kierulff Electronics
Rental Electronics
TISCO

***REGIONAL**

EASTERN
Computrend

MIDWEST
C.G. Distributors
Loonam Associates
Lowry & Associates
SEA Distributors

SOUTHERN
Tel-Tex Inc.

WESTERN
Data Systems Marketing
David Jamison Carlyle
Group III Electronics
R.V. Weatherford

LOCAL

Advanced Digital Systems
American Computers
Arch Associates
J.P. Bagoy
CMC Marketing
Compusystems
Computer Systems & Services
Data Communications & Systems
Data Management Solutions
Data Marketing Associates
Datco, Inc.
Dayton-Forester Associates
Digital Systems Marketing
Distributed Data Products
Information Technology
Manchester Equipment
Ossmann Instruments
Peripheral Products
Pro-Com Sales
R.C. Data
Supply Depot
Synchro-Sound Enterprises
Systems Marketing Consolidated
The Computer Store
Type-A-Line Business Machine Co.
Veytec, Inc.
Western Microtechnology, Inc.
Western Telecomputing

*Multiple locations–Check your local directory.

COMDISCO®

World's Largest
Remarketer of IBM
Computers/Peripherals



Proudly
Announces New
Corporate Headquarters
Located at

6400 SHAFER COURT
ROSEMONT, ILLINOIS 60018

312/698•3000

With 10-Year-Old Package

Ship Builder Sails Structured Course

By Rita Shoor
CW Staff

PASCAGOULA, Miss. — Old means obsolete in the vocabulary of many MIS specialists, but at Ingalls Shipbuilding here a 10-year-old software package has led to a 40% increase in programmer productivity, according to J.F. Davidson, manager of the 31-person business application staff.

"Work Ten [the software package] is our alternative to traditional structured methods," Davidson said after performing several benchmark tests. The only drawback may be that Work Ten programs are intended for a batch environment and cannot be utilized for on-line data base applications, he noted.

In one test, for example, the same program definition was given to two programmer/-analysts. One had about two years of experience and the other was an eight-year veteran. The relative newcomer used the Work Ten package; the "old hand" coded in Cobol.

The problem was a "very comprehensive edit program," Davidson said. In this case, the Work Ten programmer finished the job 60% faster than the experienced programmer/analyst, he said.

An average time savings of 40% is "a very conservative estimate," he maintained. Up to 80% of the programmers' time normally required to write, test and implement a Cobol program can be saved if the same program is coded in Work Ten, he claimed.

In addition, he maintained, we can make a

(Continued on Page 64)

Honeywell Updates 'Multics' With Mail, Text Editing Facilities

PHOENIX — Honeywell, Inc.'s Information Systems Division has announced enhancements to its previously announced Release 8.0 of the Multics operating system — the Multics extended mail facility and Emacs text processing facility.

The Multics operating system functions on Honeywell Series 60 Level 68, Level 68/DPS and DPS8/70 large-scale computer systems.

With the extended mail facility, geographically dispersed users operating different types of terminals reportedly can selectively list, print, delete, store and forward messages. Users need not log on to the system to receive mail.

The message format is similar to the structure of an interoffice memo with header information and body text. The header may contain such additional features as automatic transmission of acknowledgment to senders upon receipt, and allows for replies to destinations other than the sender's.

Users can also create multiple secondary mailboxes where both incoming and outgoing mail can be logged for manipulation outside the mail facility, a company spokesman said. Mailboxes are protected by standard Multics hardware security mechanisms and security software.

Text Editing

The Emacs text processing facility is an integrated editing, text preparation and screen management system. While technically an editor, the text processing facility continuously interacts with text as a text processing subsystem, according to the firm.

Developed at Honeywell's Cambridge Information Systems Laboratory (CISL), Emacs is said to provide complete management of the video terminal screen. The screen can be divided into two or more areas, enabling simultaneous display of logically different blocks of data on the same screen without affecting the editing process.

Emacs subsystems are said to allow programs in PL/1, ALM and Lisp to be entered into the system and edited with correct indentation, comment placement and declarations supplied "immediately."

Both the Multics extended mail facility and the Multics Emacs text processing facility are available for a monthly lease fee of $292 and $787, respectively, with a required license of not less than 12 months. Honeywell is at P.O. Box 6000, Phoenix, Ariz. 85005.

Maintenance Tasks Simplified

• *Input Smoothed For 360, 370 Users*

WHEATON, Ill. — Generated Systems, Inc. has unveiled a software package designed to simplify system maintenance and development for IBM 360 and 370 users. Dataryte was developed to allow organizations to apply successful report writing concepts to the input function, the vendor said.

Historically, edit routines have tended to be the least manageable and least documented programs in an application system. Dataryte solves that dilemma by placing edit criteria on a table file external to project logic, the vendor claimed.

Non-DP and DP personnel alike can therefore implement edit changes without recompilation and debugging of programs, a spokesman added.

Dataryte is available in batch or on-line mode, runs on computers compatible with the IBM 360 and 370 instruction set and costs $10,000, the vendor said from 209 N. Hale, Wheaton, Ill. 60187.

• *Package Meshes Design, Upkeep*

PHILADELPHIA — A software package designed as a framework for designing, developing and maintaining systems has been announced by Atlantic Software, Inc.

SDM/70 Version II is both a design methodology and a project management methodology, according to the firm, and offers a software option to automate the creation of project time and cost estimates.

The package reportedly offers structured analysis, design and programming with step-by-step guidelines for all three; data base administrator guidelines; auditor interfaces with information systems for data control, audit trail construction and security; quality assurance guidelines; and purchase package evaluation and acquisition guidelines.

SDM/70 Version II costs $30,000 including full documentation, training and installation from the firm at 320 Walnut St., Philadelphia, Pa. 19106.

IBM DOS USERS **DOSSIER FOR YOUR 4300**

"We will use DOSSIER as our major tool in converting to the new 4300."

"DOSSIER will make the conversion much easier by identifying standards and finding the correct name for each file."

"After conversion to the 4300, DOSSIER will continue to help us efficiently manage our libraries...."

"We are extremely delighted with DOSSIER – it's a very fine product."



Debby Schumann, Systems Programmer, Purity Supreme Supermarkets, Massachusetts.

Debby Schumann had been managing her program libraries manually, until she acquired DOSSIER. Not only does DOSSIER automate her library management, it will be an excellent tool to help her convert to the 4300.

DOSSIER goes beyond source library documentation to translate object code from program libraries into complete and current program and file information. Its 16 management reports address all aspects of controlling and auditing object libraries.

So whether you have a 4300 conversion on the way or are trying to maximize the effectiveness of your recently installed 4300, DOSSIER will help. Try DOSSIER free, without obligation, for 30 days. Discover why more than 600 companies are already using DOSSIER to upgrade, maintain, audit and clean up DOS, DOS/VS and DOS/VSE libraries.

For more information, just clip this coupon and mail to Computer Concepts, Inc., 6443 S.W. Beaverton Highway, Portland, OR 97221. Or call 503/297-4741.

Send me more information about DOSSIER

Name

Company

Address

City

State/Zip

Telephone number

DOSSIER™
Documentation & Standards Tool
a product of
CCI

English-Like Language Added to 'Model'

NEW YORK — A high-level, English-like language has been added to Model with Release 4.3, according to its vendor, Lloyd Bush & Associates.

Model was developed to provide a modeling capability to business people who have little or no programming knowledge.

It is written in Fortran IV and runs on IBM, Digital Equipment Corp., Prime Computer, Inc., Data General Corp. and other computers, the vendor said.

Addressable Applications

Addressable application areas include financial analysis, general-purpose reporting, scientific/engineering problem solving and consolidated financial statements.

Model is also available on several commercial time-sharing services, a company spokesman added.

The one-time license fee runs between $22,000 and $42,000 depending on facilities and features desired, the company said from One Battery Park Plaza, New York, N.Y. 10004.

'UFO' Update Compatible With DOS/VSE, FBA Units

HASBROUCK HEIGHTS, N.J. — Oxford Software Corp. has released Version 2.3 of User Files On-Line (UFO), making it compatible with DOS/VSE and Fixed Block Architecture (FBA) storage devices.

In addition, system compile procedures reportedly have been enhanced internally to improve execution speed of UFO transactions 40% to 60% over previous versions.

Support for CICS intersystem communications has been built in so that applications may be developed centrally and then shared with other CPUs via Vtam/SNA, according to the vendor.

Other UFO improvements include seven new UFO utilities; an ATTACH command that provides the support for asynchronous initiation of a CICS/VS task from a UFO procedure; and expanded execution inquiry facility.

The system costs $16,500 for DOS and $21,500 for OS and lease terms are available.

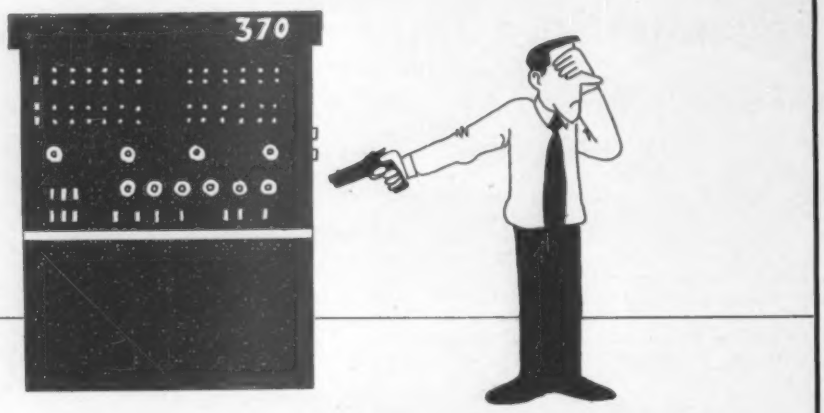
The firm is located at 174 Blvd., Hasbrouck Heights, N.J. 07604.

Package Boasts Mapics Interface

SANTA ROSA, Calif. — An on-line Master Production Schedule System which has been developed to interface with Mapics on the IBM System/34 and System/38 has been introduced by Data 3 Systems, Inc.

The MRPS 34/38M package consists of modules featuring such production schedule applications as capacity planning and shop floor control.

The complete package costs $70,000 from the software and systems house at P.O. Box 441, Santa Rosa, Calif. 95402.



Maybe you haven't tried the right medicine:

FLEE/FLIM/FLIC — Replacement for LNKEDT, MAINT, CORGZ. Reuse library space, condense any time, full partition independence, 1500 current users. $90/month-DOS/VS(E). Datapro honor roll 1977, 1978, 1979.

FAQS/FTL — CICS console hardcopy display, console log with printout, console PF key support, fast transient loader and monitor, efficient partition balancer and more! $75/month-DOS/VS(E) Datapro honor roll 1978, 1979.

FAVER — High-speed Dump/Restore utility for VSAM. Automatic cluster redefinition on Restore. Works with DL/1 and IMS too. $80/month-OS/VS $60/month DOS/VS(E)

EXPLORE/DISCOVER — Software performance monitor, offline histogram and online real time reports. Installs in 10 minutes. $110/month-DOS/VS(E).

VFBA — Converts CKD to FBA disks without changing drives, reduces CPU load due to I/O by up to 35%. $4800-VM.

We'll be happy to write you a prescription.

Goal Systems Corp: **The Goal-Getters.**

1865 Fountain Sq./P.O. Box 29481/Columbus, OH 43229/(614)-268-1775/Telex: 245337

Accounting Tools Fit DG Users Of CS/Cobol

BIRMINGHAM, Ala. — Programmed Systems, Inc. has released both a public accounting and time/expense billing software package for computers using Data General Corp.'s CS/Cobol operating system.

The public accounting package has modules for client write-up, payroll with check writing, fixed-asset accounting with investment tax credit summary and utilities such as amortization schedules.

The time/expense billing software is an integrated open-item work-in-progress and modified balance-forward accounts receivable system offering complete user flexibility, a spokesman claimed.

Both software packages were developed by the firm about two years ago, but were never offered as a general release.

Prices for the software start at $1,000, the spokesman said from the firm at Suite 305, Centennial Building, 90 Bagby Drive, Birmingham, Ala. 35209.

CICS Users Get Sysout Aid

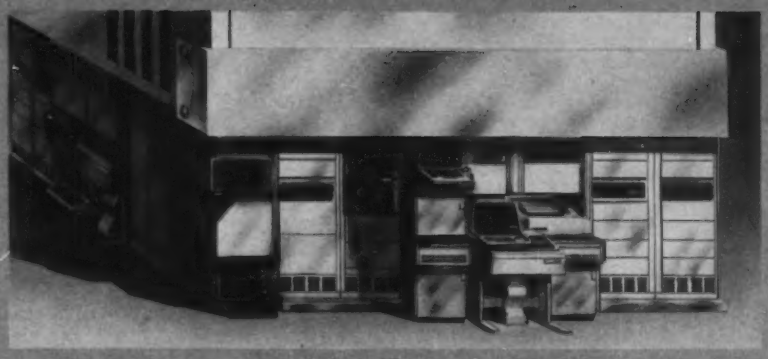
CENTEREACH, N.Y. — Axios Products, Inc. is offering the Ropes Spool Transfer Utility (RSTU), which operates under IBM's CICS to transfer Sysout data from the Spool subsystem (JES) to the Remote On-line Print Executive System (Ropes).

The Sysout data is generated by application programs for printing by the Spool subsystem. RSTU copies print data from the Spool subsystem to Ropes for printing by CICS printers.

Sysout data is selected and transferred to Ropes by RSTU transactions operating under CICS. After transfer, the data may be printed using all the features of Ropes. The original Sysout data may be requeued or deleted from the Spool queue.

The price for RSTU is $100/mo rental or $2,500 for purchase, the vendor said from 2364 Middle Country Road, Centereach, N.Y. 11720.

SPERRY UNIVAC MINICOMPUTERS ARE SUPPORTING IBM.



IBM need no longer hold total control over your distributed data processing (DDP) system.

Now you have a choice.

Sperry Univac V77 minicomputers with our PRONTO operating system tie in your terminals, additional remote minis and IBM host so you can communicate throughout your system with no software modifications. Your remotes can even talk among themselves through as many terminals as you want and remain fully functional when your host is down.

Not only do we offer faster delivery on a better product at a lower price, we make sure your system keeps working after it's installed. That's why we have over 10,000 technicians worldwide, servicing equipment whenever, wherever it needs attention.

Our system takes the risk out of DDP, because it works. Would you expect anything less of a division of the $4 billion Sperry Corporation? After all, we were first in the computer business. And we have a reputation to uphold.

We're off-loading Sperry Univac and IBM mainframes in distributed data environments all over the country. Our V77s work well with IBM. They're totally compatible.

So, if you're considering enhancing your DDP system or building a brand new one, call us at Sperry Univac Mini-Computer Operations, we listen. And while we may not be IBM's sole means of support, we sure are helping them carry their load.

For more information, write to us at Sperry Univac Mini-Computer Operations, 17900 Von Karman Avenue, Irvine, CA 92714. Or call (714) 754-6900, Marketing Communications.

In Europe, write Headquarters, Mini-Computer Operations, London, Brentfields, Stonebridge Park, NW10 8LS, England.

In Canada, write Headquarters, Mini-Computer Operations, 55 City Centre Drive, Mississauga, Ontario, L5B, 1M4.

SPERRY UNIVAC

The computer people who listen.

Sperry Univac is a division of Sperry Corporation.

See us at INFO '80, booth 2251

HP 3000 Gets Debugger

MORRISTOWN, N.J — Systems of the Future, Inc. is offering a Cobol debugger for Hewlett-Packard Co. HP 3000-II, III, 30 and 33 systems.

The package allows the programmer to use either 1968 or 1974 versions of Ansi Cobol to interactively set breakpoints at specified Cobol source lines, display and modify variables, trace execution paths, step programs one statement at a time and stop execution at a breakpoint, the vendor said.

The package costs $2,500 for a single CPU; a demonstration tape is available for $30.

Systems of the Future is located at 161 Washington St., Morristown, N.J. 07960.

REFRESH YOUR 3138-43 MEMORY...with a CPU upgrade to increase your memory capacity.

- Exceed IBM limits to 4.0 MEGS to support new applications and/or operating system software.
- Short and long term leases as well as purchase plans available.

Contact:
Bill Behrens
(201) 428-9393

TOTAL TECHNICAL SERVICES, INC.
PARSIPPANY, NEW JERSEY

Five-Option System

Modular System Maps in Fortran

SAN DIEGO — Integrated Software Systems Corp. is offering a mapping software system that is reportedly capable of analyzing geographic data, selecting the best cartographic formats and generating publication-quality thematic maps.

Designated Odyssey, the Fortran package comes in modules, as a basic system with five options, so users can purchase only those features necessary for their particular application, a spokesman said.

The system combines geographic data files with cartographic data bases — counties, census tracts and soon — to produce a variety of two-dimensional shaded polygon maps and related annotation in high-quality type fonts, the vendor claimed, adding a starter kit of cartographic data bases is included.

Maps can be drawn with line or dot shading, black and white half toning or color shading, the spokesman said.

The system automatically identifies color or shade values with a legend or histogram and gives the user control over the size and scale of the map.

The product costs $20,000, the vendor said from Suite G, 4186 Sorrento Blvd., San Diego, Calif. 92121.

Routines for Series/1 Serve Subscription Fulfillment

CEDAR FALLS, Iowa — United Software Associates, Inc. is offering a number of software routines designed to operate on the IBM Series/1 minicomputer as part of a subscription fulfillment system.

The first offering is a series of subroutines that will convert a date from Gregorian to Julian format and also generate a numeric value signifying the day of week.

With this software, a user can determine the number of days between any two dates by subtracting one date factor from another, a spokesman noted.

The routines are written in EDX and provide for leap years and the turn of the century. They cost $35 for a one-time perpetual license fee.

The second set of routines is geared to compare two character strings for high, low or equal and branch to a user-specified address depending upon the results, the spokesman continued.

Useful for comparing character strings and written in Series/1 assembler, the compare routines cost $25, he said.

Finally, United Software is offering a documentation list program that formats user prepared documentation and, if specified, will create an index of information located in the document. This program costs $50.

All of the routines are available immediately, but will only be sold if the user agrees in writing not to distribute the software, the spokesman said. The firm may be reached at P.O. Box 743, Cedar Falls, Iowa.

THE POWER OF INTERACTIVE COMPUTING AND THE COST-EFFECTIVENESS OF BATCH

OSI COMBINES VM/CMS WITH MVS AND SUPERWYLBUR TO CREATE OSI/AIRS

OSI has combined IBM's Virtual Machine (VM) and Conversational Monitor System (CMS) with our remote-batch MVS and SUPERWYLBUR* systems. The result is OSI/AIRS** (Advanced Interactive Remote System), a system offering the power and flexibility of interactive computing coupled with the cost-efficiency of remote-batch computing.

With the increasing economic pressure to reduce costs, OSI now offers you the complete solution to your remote computing needs. From the people that run the player selection systems for both tha Dallas Cowboys and the Philadelphia Flyers come equally effective and powerful tools to help you make the right economic decisions in running your business.

For the refinery operator or designer, we have PS-01 — one of the most powerful cost effective process simulation programs on the market today.

For the homebuilder, we have BIAS — a complete accounting system developed for the homebuilder by experts in the industry.

For municipal governments, we offer GEMUNIS* — one of the most comprehensive integrated municipal information systems available.

For your data base requirements, we offer several very powerful Data Base Management Systems including System 2000/80, and IMS.

For program development, we offer both interactive and remote-batch capabilities including VM/CMS and SUPERWYLBUR.

So, if you need the power and flexibility of interactive computing, but you don't need the expensive hardware or technical and operations staff, call OSI — The Computer Utility. We'll work with you to assess your needs and define the ideal set of features to fulfill them. Call or write for a free brochure. Optimum Systems Incorporated, Marketing Department, 2801 Northwestern Parkway, Santa Clara, CA 95051; (408) 987-4444.

*SUPERWYLBUR and GEMUNIS are marks of Optimum Systems Incorporated denoting a computer software system proprietary to Optimum Systems Incorporated.

**OSI/AIRS is a service mark of Optimum Systems Incorporated.

OSI Optimum Systems Incorporated

BRANCH OFFICES: Chicago • Dallas • Denver • El Segundo • Houston • Minneapolis • New York • Newport Beach • Palo Alto • San Francisco



'We Call It Our "Real Time" System 'Cause Everyday We Have a "Real-Time" Getting It to Work Right.'

HARD-TO-GET DEC DISK DRIVES

Now Available

RWP06-BA RP06-BA RP06-AA
RWM03-BA RM03-BA RM03-AA

Like New, DEC Guaranteed Maintainable

We're taking orders now for 30- to 60-day deliveries on these hard-to-get DEC disk drives. Hurry, they won't last long. To order or for more information, call

(415) 461-0894

American Peripheral Exchange

P.O. Box 837
Kentfield, CA 94914
Go Ape – Buy American

PDP-11s Get Credit Data

WRENTHAM, Mass. — An on-line credit information retrieval system for Digital Equipment Corp. PDP-11 minicomputers that is said to provide in-house automated credit reporting services has been introduced by Trafalgar Square Associates, Inc.

Geared to run under DSM-11 Mumps programming, the On-Line Credit Exchange (Once) software allows users to access a credit data base from either local or remote terminal locations.

System Options

The system utilizes passwords and locates credit profiles by keying a subject's name. Options include a system timer to handle low-volume subscribers.

Also, system security is built on a tied terminal concept that limits users to only those functions allowed by the systems owner.

Finally, the system keeps track of subscriber usage by performing accounting functions and generating reports, a spokesman said.

The Once package costs $25,000 from the vendor at 15 Trafalgar Square, Wrentham, Mass. 02093.

Econalyst Gives Report Service On ADP Net

ANN ARBOR, Mich. — Econalyst, an economic information and computing service, has announced that Townsend-Greenspan & Co., Inc. reports are now available on-line through Automated Data Processing, Inc.'s (ADP) worldwide teleprocessing network.

The reports, which appear about three times weekly, discuss the U.S. economy and interpret the effect of current economic trends on specific industrial segments.

A key-word indexing system allows the corporate economist to search current and historical reports to select and print topics of interest.

The price for the service ranges between $2 and $5 per report. Reports are usually 10 to 70 pages long, the vendor said from 175 Jackson Plaza, Ann Arbor, Mich. 48106.

System Provides Linear Programs

DENVILLE, N.J. — HS/LP, a general-purpose linear programming system reportedly capable of solving large-scale models on small and medium-size computers, is available from Haverly Systems, Inc.

The system can be executed interactively or in batch mode through a control language interface or may be invoked under user program control.

Written in Fortran, the initial implementation is for Data General Corp. Eclipse computers running under the Advanced Operating System. Implementation on other computers is scheduled, the vendor noted.

The one-time license fee for HS/LP is $15,000, Haverly said from 78 Broadway, Denville, N.J. 07834.

Vector Automation Offers On-Line Graphics Package

BALTIMORE — A device-independent interactive graphics software package has been unveiled by Vector Automation, Inc. for its Graphicus-80 intelligent refresh graphics terminal.

The G-Core software is compatible with the 1979 Siggraph/ACM Core standard and aimed at applications requiring high resolution and a large number of vectors. The software reportedly differs from other similar systems because it resides in the terminal rather than the host computer.

The only programs resident in the host are Ansi Fortran routines containing Core-compatible entry points and message formatting routines to pass user requests to the terminal, a spokesman stated.

Geared as a bundled package, the software operates through the Graphicus-80 terminal controller to execute user requests, maintain the display file and control all graphics devices, including the terminal's display. In addition, the 1,000-line host package can be transported to a variety of systems, the spokesman claimed.

G-Core is provided at no charge to present terminal users or sold with the Graphicus-80 system for $24,500.

Additional information on the graphics system can be obtained from the vendor at Village of Cross Keys, Baltimore, Md. 21210.

'Library' Open To Prime Users

HOUSTON — An updated version of International Mathematical & Statistical Libraries, Inc.'s (IMSL) Library for users of Prime Computer, Inc. models 450, 550, 650 and 750 that reportedly provides the entire set of 495 Fortran subroutines has been announced by IMSL.

The IMSL Library Edition 8 is said to allow users to utilize the Fortran codes as building blocks in the development of scientific and engineering application programs.

The package costs $1,600 for use on large mainframes, $1,400 for use on minicomputers, from NBC Building, 7500 Bellaire Blvd., Houston, Texas 77036.



Bobby Harper, Manager of Information Services, Vought Corporation

Vought Corporation makes planning fly with IFPS.®

Vought Corporation, aerospace subsidiary of The LTV Corporation, is a half-billion dollar company which builds military aircraft, missiles and space systems and commercial aircraft components.

Bobby Harper, Vought's Manager of Information Services, recently discussed their use of EXECUCOM's Interactive Financial Planning System (IFPS).

"IFPS was chosen by Vought Corporation in 1976 as our first venture into the area of Decision Support Systems. Comparative studies of products existing at that time proved IFPS to be the only one with a current set of superior capabilities plus unlimited expansion possibilities," he said.

"IFPS has proven itself in direct support of management by providing timely response to management questions that otherwise would have remained unanswered in the time frame allowed. Applications have been most prominent in the financial areas. However, many significant uses are found in manufacturing, materials, and engineering," he noted.

Uses at Vought include debt planning, debt management, treasury operations, consolidation of balance sheet and income statements, transportation, facilities, and engineering planning and forecasting.

He continued, "Answers to critical questions that once were not available may now be researched in a reasonable time. Analysis of data that required production programs and unacceptable lead time to compose routines may now be obtained in time for decision-making department heads to use it."

The challenge of the 80's requires management support that IFPS now furnishes to over 500 users worldwide. Can you afford to wait?

IFPS runs on IBM under OS and DOS/VS, CDC, Univac, Honeywell, Burroughs, Prime, DEC, Harris, and H-P hardware, and is backed by the best professionals in the business.

Contact EXECUCOM today to learn how you can take advantage of the finest available decision support tools with a minimum initial commitment.

EXECUCOM SYSTEMS CORPORATION
Austin, Texas 78766

IFPS®

P.O. Box 9758, Department D3
(512) 345-6560

Sales offices in: Houston, (713) 358-2918; Denver, (303) 494-1222; Chicago, (312) 951-6202; Toronto, (416) 492-7860; New York, (203) 255-2695; Boston, (603) 882-8560; and Washington, D.C.

CICS AND IMS USERS

SPECIAL
INFO 80
OFFER!

SIGN UP FOR A
FREE CICS or IMS
Reference Handbook
at Booth No. 1808

Stop by and find out more about our fine software collection.

OMNICOM™
The Software for Electronic Mail

GUARDIAN™
For complete Protection of CICS resources

INTERTEST™
Cuts CICS Application Development Time by 75%

ON LINE SOFTWARE INTERNATIONAL
65 ROUTE 4 EAST
RIVER EDGE, NJ 07661

Offering the finest in software services; Consulting, Education, and Products.
201-488-7770 800-526-0272

How to count your chickens before they hatch.

Surprises can be expensive. Even good news can cost money if your company is not prepared for it.

With financial modeling you can avoid surprises and plan calmly for whatever the future has in store.

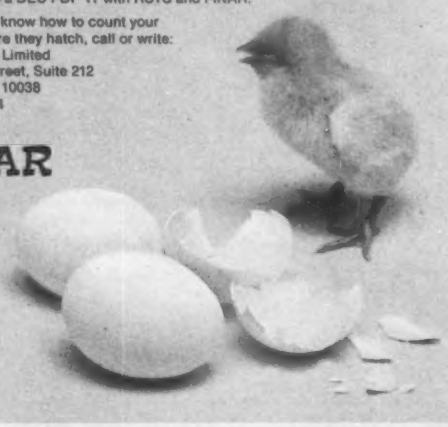
FINAR is the latest financial analysis and reporting system. It will help you plan:

- Budgets
- Cash flow
- Capital investment
- Project evaluation
- Forecasts
- Consolidation

All you need is a DEC PDP 11 with RSTS and FINAR.

If you'd like to know how to count your chickens before they hatch, call or write:
Finar Systems Limited
132 Nassau Street, Suite 212
New York, NY 10038
(212) 222-2784

FINAR



Ship Builder Plots Course With 10-Year-Old Package

(Continued from Page 59)

college graduate who majored in computer science productive in terms of writing Work Ten programs in three to six weeks, he said.

Automatically Structured

Work Ten is automatically a structured type of language, he explained. The software produces the necessary coding for standard file manipulation functions (READ, WRITE, OPEN and CLOSE statements and end-of-file checks).

Logic for file matching, control breaks, editing and reformatting is also automatically generated, Davidson said, with the result that "the programmer is relieved of repetitively designing logic to access, match and/or write records."

Davidson speculated that the package may no longer be marketed because of a negative reaction from experienced programmer/analysts. Work Ten was no challenge to them, he said.

Informational parameters describing file, record and storage characteristics are input to the Work Ten compiler and the output is a Cobol source program, which is then compiled via a standard Cobol compiler, he said.

If you're working strictly with Work Ten, you don't need to know Cobol, he claimed, "but it helps."

With a configuration that includes two IBM 370/158s operating under MVS/JES3, the staff is maintaining some 250 systems consisting of approximately 3,000 programs, Davidson said. Almost 2,500 of these programs were written in Work Ten.

The Ingalls staff has been exposed to coding techniques such as the mainline concept, nested IF statements and limited GOTOs with some unsatisfactory results, Davidson said.

Approximately six years ago, the firm installed a System 2000 data base management system, he recalled. Consultants from MRI Systems Corp. (later acquired by Intel Corp.) were brought in to write data base applications. These consultants utilized structured coding techniques, according to Davidson.

The Information Systems staff has rewritten the majority of this code, he said. "We removed all of the nested IF statements and made the system more modular."

The recoding effort should not reflect negatively on the MRI consultants, but on the coding techniques they used, according to Davidson. As a result of this experience, he described himself as being in "deadly opposition" to using structured programming techniques at any future time.

And why should he when the current Ingalls staff of 31 programmer/analysts (including himself) is maintaining "twice as many programs" as the 65-person staff did in 1973?

If an acceptable definition of programmer productivity is to provide information systems technicians with the tools that will enable them to code and maintain more programs in less time, then the technical staff at this U.S. Navy shipbuilding contractor has definitely increased its productivity, he said.

Based upon records of the man-hours charged to each project, the staff has also succeeded in completing projects within 10% of the original man-hour estimate, he continued.

Although in opposition to generally recognized structured coding techniques, Davidson's staff does conduct design walk-throughs for new systems and major revisions to on-going systems.

These walk-throughs include representatives from both the information systems and user department staffs. Described as "very informal sessions", the walk-throughs are not based on any particular structured methodology, he noted.

The technician who is most knowledgeable about the system goes through it with the section manager from the involved user departments. Program code walk-throughs are only carried out on a "limited basis," according to Davidson.

Work Ten Unavailable

Now comes the bad news. The Work Ten software which has contributed so heavily to these favorable statistics is no longer marketed, according to Bruce Forsberg, executive vice-president of NCI, the software vendor which provided Ingalls with Work Ten under a long-term leasing agreement.

NCI is now engaged in marketing a package designed for on-line program development. Competing with such packages as IBM's time-sharing option with the structured programming facility (TSO/SPF) or Panvalet on-line from Pansophic Systems, Inc., NCI's Owl software runs under both OS and DOS operating systems, he explained.

The firm, a wholly owned subsidiary of Quanex Management Sciences, has shifted its area of concentration from the batch to the on-line market, Forsberg said.

Davidson speculated that the package may no longer be marketed because of a negative reaction from experienced programmer/analysts. Work Ten was no challenge to them, he said.

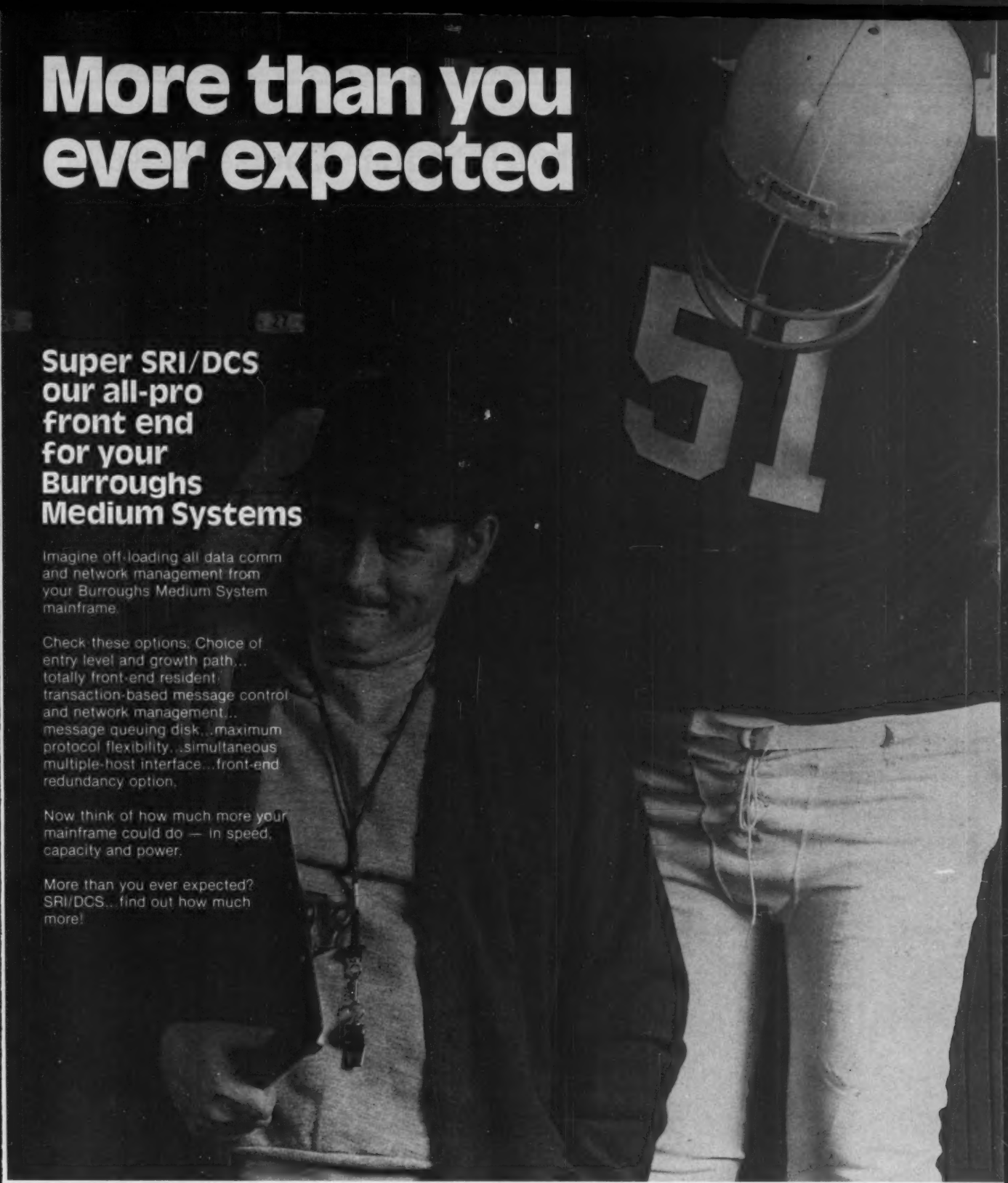
However, he maintained that the Ingalls technicians were very happy with Work Ten software. "This language encourages programmers to concentrate on overall objectives instead of details," he said. It was designed "to take the mechanical aspects out of the programmer's hands and enable them to concentrate on the creative aspects."

Asked whether he had run into any problems in maintaining the package, Davidson's response was "absolutely none." In fact, he said, the shop quit using NCI's maintenance service approximately six years ago because there was no need for it.

Correction

Manufacturing Software Systems, Inc., which is offering a free updated version of its Manufacturing Resource Planning vendor list [CW, Sept. 22], is located in Vermont, not Virginia. Its full address is P.O. Box 278, Williston, Vt. 05495.

More than you ever expected



Super SRI/DCS our all-pro front end for your Burroughs Medium Systems

Imagine off-loading all data comm and network management from your Burroughs Medium System mainframe.

Check these options: Choice of entry level and growth path... totally front-end resident transaction-based message control and network management... message queuing disk...maximum protocol flexibility...simultaneous multiple-host interface...front-end redundancy option.

Now think of how much more your mainframe could do — in speed, capacity and power.

More than you ever expected? SRI/DCS...find out how much more!

SRI
SYSTEMS RESEARCH INCORPORATED

2400 Science Parkway
Okemos, MI 48864
(517) 349-0200

Call (517) 349-0200 or send coupon

Ask for Charlie Warzecha or Mike Barry. They'll provide details (or demonstration) on SRI front-end processors for Burroughs Medium Systems. Ask, too, about SRI software designed specifically for Burroughs Medium Systems.

SYSTEMS RESEARCH INCORPORATED
2400 Science Parkway, Okemos, MI 48864
B1080

Please rush further information on SRI/DCS to:

Name_____

Title_____ Phone_____

Company_____

Address_____

City_____ State_____ Zip_____

Processor B2_____ B3_____ B4_____

Call Traffic Software Gives Cost Data

ANN ARBOR, Mich. — Software that processes call traffic data to produce minimum cost, long-distance service information is being offered by the DMW Group, Inc.

The Teletraffic Optimizer Program (TOP) processes data from the usage of Wats, FX, DDD, tie lines and specialized carrier offerings in combination with automatic route selection systems, queuing and other control alternatives, the vendor explained.

Results are based on processing actual call data rather than on estimates or summary data derived from an analytical model.

Additionally, simulations of proposed new configurations can be run prior to installation, which allows selection of the configuration that best handles the actual call traffic before it is purchased, the firm said.

TOP costs between $15,000 and $20,000, depending on the hardware configuration.

The DMW Group is located at 2395 Huron Parkway, Ann Arbor, Mich. 48104.

'Master File Update' Model Program Course Issued

ARVADA, Colo. — Educassettes, Inc. has released Master File Update, the third course in its Model Program Series.

The self-study audiocassette course uses the Warnier-Orr design technique to develop a model structure for the Master File Update program.

Topics discussed in this course include the development of the basic master file update logic and the generalization of the design to allow the updating of sequential or direct master files by any number of input transaction files, the vendor said, adding, the model structure is adapted for the on-line master update function.

The course is presented in two half-hour segments and is accompanied by over 50 illustrations. It costs $109, Educassettes said from Suite 102, 6777 Wadsworth Blvd., Arvada, Colo. 80003.

Security Timing Service Offered on Rapidata Net

FAIRFIELD, N.J. — Rapidata, Inc., the nationwide remote computer services firm, will begin offering security timing analysis programs from Securities and Commodities Corp. (SCC) of Northport, N.Y., through its network.

SCC will market and maintain its proprietary computer programs and data bases utilizing Rapidata's network and computer service.

The SCC programs require no prior computer knowledge, according to the firm. The service allows users of terminals and small computers, such as the Radio Shack Corp. TRS-80, to build, update and maintain their own securities data bases using programs developed and tested by SCC.

Programs for fundamental analysis, stock timing and stock charting are available, particularly in the area of option trading.

Rapidata is headquartered at 20 New Dutch Land, Fairfield, N.J. 07006.

Nixdorf Ties WP, DDP Systems With 'The Link'

BURLINGTON, Mass. — Nixdorf Computer Corp. has announced The Link, a hardware and software package that links its 8840/5 word processing (WP) system with the firm's 600 series of distributed data processing (DDP) systems.

The Link uses the Distributed Processing Executive (Dpex) or, in the case of 480 data entry systems, the Advanced Data Entry Executive (Adex) operating systems.

Communications between the two systems is concurrent with other system functions, the vendor said.

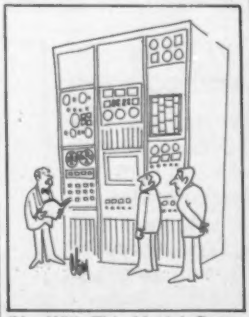
The Link costs $50, Nixdorf said from Ohare Plaza Mall, 5725 E. River Rd., Chicago, Ill. 60631.

Astrocom Adds WP Capability For Series 760

ST. PAUL, Minn. — Astrocom Corp. has announced a word processing (WP) capability for its Series 760 small business computer.

The feature, called Astrotype 1, was designed to be used with the Dataproducts Corp. Model D50 bidirectional 47 char./sec printer.

The software package costs $1,000 from Astrocom at 120 W. Plato Blvd., St. Paul, Minn. 55107.



'No, With This Model, Batteries Are Not Included . . .'

TSO USERS!
THE
Applied Software
TSO/SUPERSET-UTILITIES
IS THE
BEST ALTERNATIVE
TO IBM

Compare:	Applied Software's TSO/Superset Utilities	IBM'S TSO Data Utilities
Cost	$130/Installation	$144/CPU
Software Support	Class "A"	Class "C"
Full-Screen Support	Yes	No
132 Column CRT Support	Yes	No
LISTJES Command (SYSOUT Previewer)	Yes	No
TSOSORT Command	Yes	No
JTIP Interface	Yes	No
Fast Merge	Yes	No

WRITE OR CALL FOR FREE BROCHURE AND TECHNICAL COMPARISON
Applied Software, Inc.
4440 P.G.A. Boulevard, Suite 204
Palm Beach Gardens, Florida 33410
(305) 626-4818
OVER 300 TSO CUSTOMERS WORLD WIDE

MIAMI SEMINAR
DATA BASE MANAGEMENT SYSTEMS
CONCEPTS & MODELING
Focusing on:
• Concepts
• Systems Modeling
• DB Models
• Applications
Designed for DP Personnel in:
• Management
• Technology
• Systems Planning
INTERNATIONAL
Business & Technology Seminars
Write or Call:
SCS International
P.O. Box 344101
Coral Gables, Fl 33114
(305) 255-7511
October 23-24 (English Language)
October 30-31 (Spanish Language)

CICS/DOS/VS USERS
GUARDIAN™
for complete on-line security
GUARDIAN offers you, the DOS user - the same security protection for your on-line resources that our CICS/OS GUARDIAN users enjoy. Through simple rules you define in English, GUARDIAN completely protects terminals, files, transactions, users, and most widely used databases. For efficient, flexible, and easy to use security, send for more information, or call 800-526-0272
in NJ (201) 488-7770
ON LINE SOFTWARE INTERNATIONAL
65 Route 4 East
River Edge, NJ 07661
I'd like to know more about GUARDIAN CWG26
NAME _____
TITLE _____
COMPANY _____
ADDRESS _____
CITY _____ STATE _____ ZIP _____
PHONE _____

AGENTS WANTED FOR MANUFACTURING SOFTWARE.
Do you have hands-on experience with computerized manufacturing systems? Then together we can help improve America's productivity!
Our Manufacturing Resource Planning (MRP) systems are now available to manufacturers of defined sizes. For the experienced agent or systems house, we offer territories, a comprehensive marketing program and the *best* MRP software system on the market. Package includes complete and useable documentation and end-user education. Results will be measured on a quarterly basis against quota.
Please send company history and present product lines to Mr. Ross Trenholm.
SOFTWARE INTERNATIONAL
Elm Square, Andover, MA 01810
(617) 475-5040
OFFICES AROUND THE WORLD
SELL FOR US.
WE'RE THE LEADER.

Our CONTROL/IMS REALTIME™ software package has always been one of the best ways to control IMS resources.

Now it's even better. Because now it's available with Asynchronous Services that incorporate an Automatic Early Warning Feature.

Our Asynchronous Services give you continuous monitoring of IMS —it's like a constantly-open "window", rather than just a "snapshot" of activity. This continual monitoring frees the MTO from being continually tied down at the keyboard, because the system will automatically warn him if and when his undivided attention is needed.

As part of this fulltime watch over IMS, our software package also watches out for problems, and alerts you to them before they become crises. What's more, you define the thresholds for this Early Warning, giving you needed flexibility while maintaining optimum control.

Boole & Babbage's CONTROL/IMS REALTIME is the only software package that gives you this vital Early Warning feature combined with a continuous monitor service.

CONTROL/IMS REALTIME gives you even more, it'll provide you with comprehensive analysis and facility management reporting. And you can query the system at any time from any terminal. So you can control, plan and optimize day-to-day workloads, as well as project needs for the days ahead.

And CONTROL/IMS REALTIME gives you all this with a minimum of time and effort, so you can give more of your efforts to maximizing throughput and minimizing costs.

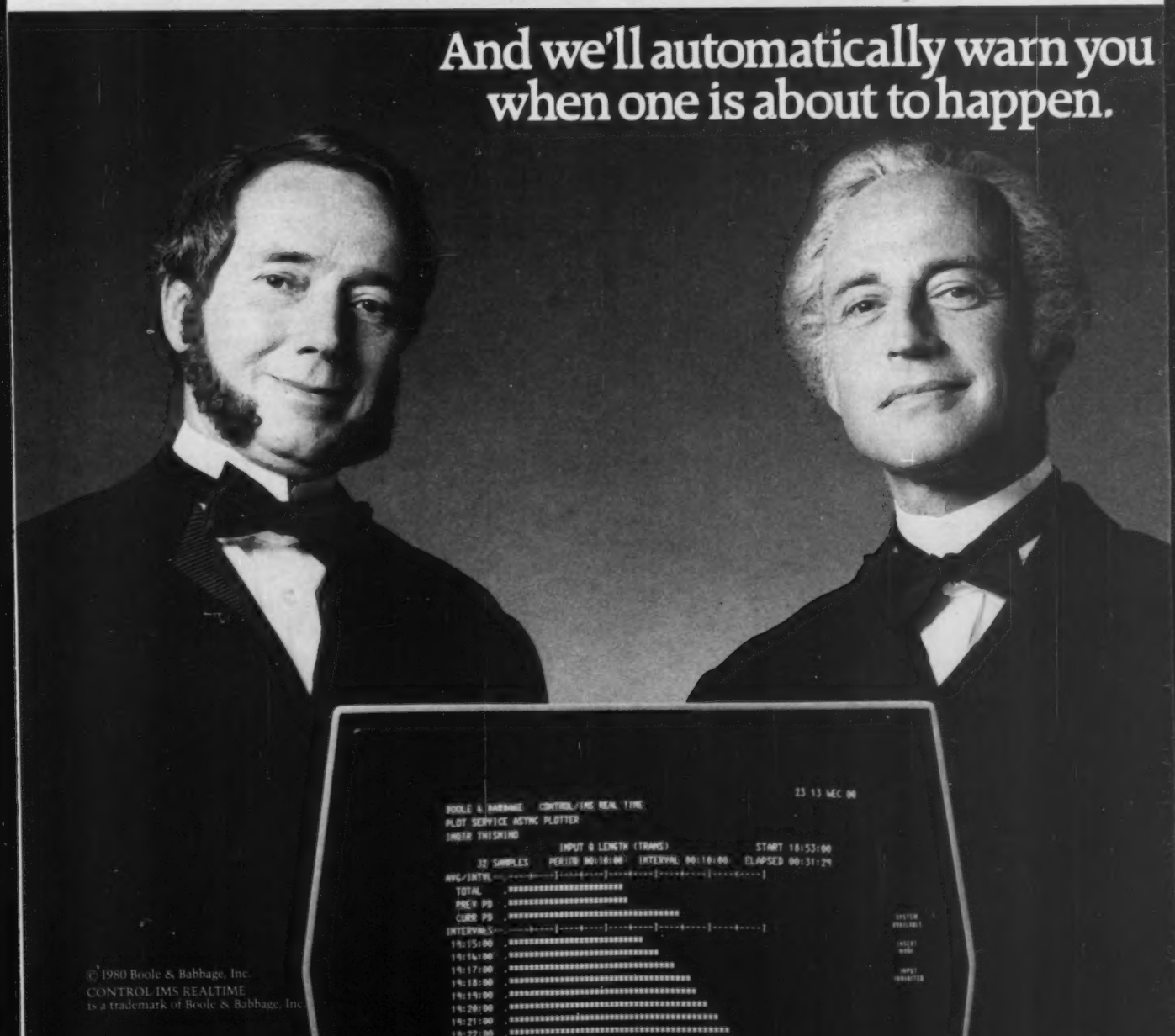
Get all the information on CONTROL/IMS REALTIME with Asynchronous Services and Automatic Early Warning. Just contact Chris Sabo at 510 Oakmead Parkway, Sunnyvale, CA 94086. Phone Toll Free (800) 538-1872. In California, call collect (408) 735-9550.

CONTROL/IMS REALTIME.
For continuous control over your IMS resources.

Boole & Babbage

Boole & Babbage can now continuously monitor IMS for problems.

And we'll automatically warn you when one is about to happen.



© 1980 Boole & Babbage, Inc.
CONTROL/IMS REALTIME
is a trademark of Boole & Babbage, Inc.

BASF polishes off headcrash.

Forget about media-induced headcrash when you specify BASF Tridents or Storage Modules. BASF polishes its uncoated metal disks to a mirror finish before the magnetic coating goes on. This assures the smoothest surface for optimum headflight characteristics. In addition, BASF coats each disk with the most durable magnetic coating, then polishes and burnishes it by a unique process, assuring long-lasting trouble-free operation. All oxide particles in the coating are magnetically oriented for greater packing density. For peak performance, each pack is 100% drive-tested at the factory. For the name of your nearest supplier, write BASF Systems, Crosby Drive, Bedford, MA 01730, or call 617-271-4030.

All BASF Trident and Storage Module packs are available for immediate delivery.

Each BASF disk pack is supplied in a precision-molded solid Lexan® plastic cover set, so you can be sure of absolute cleanliness when the pack is stored off-line.

80 MB capacity Trident packs are available in three configurations: 1. 100% error-free – for the most demanding applications. 2. Flag-free – for systems with error correction but no alternate track reassignment. 3. Standard – for systems with error correction and reassignment capability.

Only BASF has had more than four decades of experience in magnetic media...more than twelve years of disk pack experience in the U.S.A.

80 MB capacity Storage Module packs are available formatted for CDC or Honeywell drives.

BASF can work with you to accommodate special error criteria requirements.



BASF Disk Packs Floppy Disks
Computer Tapes Mag Cards Cassettes Computer Peripherals

Management And Distributed Computing



By Robert W. Shirey



Part 1: Origins and Viewpoints

"Decentralization, as the term is usually understood, means division of labor and is nothing new."
— Peter Drucker, 1960

"Distributed processing is not a new idea."
— David J. Farber, 1974

Distributed computing means dispersing a single, logically related set of tasks among a group of geographically separate yet cooperating computers.

The distributed computing concept is the result of trying to increase computer productivity by applying ages-old management ideas to new technology. One idea is division of labor, which increases productivity through parallelism. Another idea is specialization of labor. Distributed computing uses the fact that, like people, different computers do best at different kinds of work. A third idea is delegation of responsibility. A distributed computer system (DCS) delegates computing responsibility, and it may also delegate authority by decentralizing system control. In principle, therefore, distributed computing is not a totally new idea.

Although distributed computing seems familiar in principle, it is not simple in practice. Distributed computing means putting computing units where the work is and then connecting them so that they communicate. That sounds easy — like putting in a telephone — but it's not. At least, no one claims to find it especially easy to design, build and operate a DCS.

The main problem is the richness of the DCS concept. Distributed computing involves much more than just new arrangements of computer hardware and data communications. It also affects the design of operating systems, applications and their data bases, and the institutional organizations of DCS developers, operators and users. In short, distributed computing seems to touch on all the computer sciences and most of the management sciences, and it raises their complexity.

Managers Vs. Technicians

When an organization builds a DCS, two groups must work together, management generalists and computing specialists. This is true for any computing system, but it's especially important to the success of a DCS. Some of the strongest forces behind the DCS concept are economic or psychological in nature. The analysis of such forces in DCS design takes more active participation from managers than in traditional, centralized systems.

Unfortunately, managers and technicians often do not cooperate well on a DCS design because they see the objectives differently. Also, each group lacks knowledge and understanding of the other group's role and methods. For instance, computer technicians are generally unfamiliar with management theories of organizational design [Frnz76]. In short, one person rarely has training in more than one field, so most people "look at the broad area of information systems from a single — and too often a single-minded — perspective [Keen78]."

Professional managers see distributed computing as an old organizational concept applied to a new productive resource. They are trained to break large or complex tasks into smaller, simpler, more manageable jobs that can take advantage of specialized skills and tools. To them, computers are powerful new tools with many skills.

Computing technicians see distributed computing as a new architectural concept for systems of hardware, soft-

(Continued on In Depth/2)

When building a distributed computing system (DCS), management generalists and computing specialists need to cooperate. But most people are trained in only one discipline, so each group lacks understanding of the other group's role and problems. This series speaks to both groups.

For managers, it explains the distributed computing concept and tells how to make decisions that lead to effective applications.

For technicians, the series reviews themes in management thinking that bear on DCS design, development and operation.

The series, supported by The Mitre Corp., has four parts. Part 1 tells where distributed computing came from and what it is. Part 2 tells what it can do. Part 3 discusses organizational design and strategic planning. Part 4 describes methods for payoff analysis and system design.

IN DEPTH

(Continued from In Depth/1)

ware and data communications. They are trained to select and configure hardware and software elements that optimally meet the users' requirements. To them, distributed computing greatly expands the repertoire of system possibilities.

To improve cooperation, both groups need to add to their own knowledge. For general managers and system users, DCS design is full of new technical principles and cost relationships. For technical specialists, there are theories of organization and behavior to be learned. Furthermore, it is important for the two groups to establish a common core of understanding concerning what a DCS is and what it's good for.

This four-part series addresses both groups, managers and technicians. It tries to explain the distributed computing concept to the managers, to define management issues in DCS design and to survey methods for analyzing those issues. However, the series also seeks to expose technicians to themes of management thought that can play a major role in DCS design. In this context, a manager is a business generalist, a person charged with making decisions and carrying them out to achieve an organizational goal. The manager is not a technician in the sense that he doesn't need to be able to program or operate a computer. However, he must understand the productive capability of his equipment.

Technical, Management Origins

Distributed computing is the direct result of a revolution in computer prices and performance. Modern, solid-state electronics continue to shrink computers in size and cost. At the same time, reliability and capability increase. These changes enable system designers to consider several attractive alternatives to the traditional, centralized computer center. The new choices involve decentralizing the computer and distributing its power to where it is needed. This also means distributing the work to where it can be done best.

However, distributed computing also has management origins. Even before computers began to shrink so rapidly in price and size, there already were good reasons to decentralize. First, large centralized systems are becoming too complex to manage well. Second, large systems have large consequences if they fail. Third, smaller users of large systems often become dissatisfied because they can't get service tailored to their needs. Later in Part 1 we discuss these problems in more detail.

Terms and Variations

Spreading computer power and system control outward toward the users can improve service while reducing risk and complexity. That is a basic idea behind distributed computing. But there are many ways to distribute a system. Physically, for example, a single large regional computer can be replaced by several smaller, local office computers. Going further, one can replace a local office computer by intelligent terminals located at individual workstations.

Functionally, there are several choices for managing data. Local computers could connect to a regional data base, or a regional machine could access several locally maintained data files. Finally, the manager can distribute the organization by decentralizing the work of planning, building and operating a system.

Thus, the term distributed computing is used today in many ways. It denotes all sorts of combinations of computing equipment and functions.

The term has no single correct definition. Later in Part 1 we review some of the most popular terminology and describe several dimensions along which a system can be distributed.

Advantages and Disadvantages

Regardless of how they define distributed computing, people generally agree on why they like it. As mentioned above, they want to improve service while reducing risk and complexity. They want to control the data base needed to do their job. They want to control their own computing costs. They want a high level of computing capability at the places where data is created and used. They want to avoid moving data from a local to a central site for processing and then moving the results back again. They want to enable local sites to share their local

We've been making your System/34 more productive.



Meet the newest member of the Decision Data family of System/34, System/38 peripherals: the 3751-11 Display Station.

Plug-compatible with your IBM System/34 and System/38.

People-compatible with your operators.

With all the things that do so much for operator comfort—that reduce fatigue, ease tension, and in turn, improve efficiency and boost productivity: document holder, movable keyboard, palm rest, adjustable clicker/alarm, screen tilt, non-glare filter, field convertible numeric pad, cursor position display, expanded error message display, and automatic dimming.

It's easy to use. Easy to move. Easy to pay for on lease or purchase. And easy to get because our delivery is quick. And it's the first of a new series of display stations we've prepared for System/34 and System/38 users.

Fits in like everything else we make. And like they make.

We offer more System/34 and System/38 peripherals than any other independent peripheral manufacturer. And we offer more features than IBM.

data bases and computers when needed.

Potentially, a DCS has many different functional, economic and psychological advantages over a centralized system. Functional advantages can include greater continuity of service, smoother growth, better performance, easier restructuring and simpler development. Economic advantages can include reduced costs for communications, staff and initial investment. Psychological advantages can result from being able to match the form of a DCS to that of the human organization that must use it. Part 2 will discuss all of these potential advantages in detail.

Part 2 will also discuss potential disadvantages, many of which stem from the newness of DCS technology and may yet be corrected. There are several major problems. First, multiple-processor systems are harder to design than single-processor. Second, a DCS has many more interfaces to match and manage. Third, modularity restricts local application size and complexity. Fourth, decentralization can lead to overcomputerization. Fifth, every newer technology has added unknown risks that trap the pioneer.

In general, distributed computing is an active research area. Many questions remain unsettled in the areas of system management, data base structure, processor architecture and communication.

Three general management topics have special importance in distributed computing. They are organizational design, strategic planning and cost-benefit analysis; and they arise as follows. First, a DCS should match the form of the organization that uses it, and the essential modularity and flexibility of a DCS makes this possible in most cases. This raises the question of what the proper organizational and system forms are. The question's key issue is centralization vs. decentralization. Personal preferences, styles and emotions strongly affect the choice of organizational design, so quantitative analysis is difficult.

Organizational design in turn affects the long-term success of an enterprise, which means that DCS design overlaps with strategic planning. In a 1979 Booz, Allen & Hamilton Survey, more than 500 U.S. corporate-level business executives were asked where corporate responsibility should lie for handling strategic issues in information processing [Popp79]. The respondents agreed that the responsibility should be shared among the topmost corporate officers, and 81% mentioned a chief information/computer executive.

Management Concerns

In forming strategic plans, the manager deals with broad design issues rather than implementation details. In addition to internal organization, the DCS strategic planner must consider external, environmental factors and the trend of future computing technology. Again, since these three contain uncertainties, analysis is difficult. To relate and compare the choices, the planner needs a common basis. In most cases, managers reduce the options to equivalent dollar costs and use return on investment as the key decision factor.

Few subjects have more importance for a manager, especially a top manager, than organizational policy, strategic planning and investment analysis. An extensive literature exists for all three, and the part dealing directly with computing resources has grown rapidly. However, little methodology has emerged so far for making management decisions on distributed computing systems.

Part 3 of this series will introduce the management problem in distributed computing. From the experiences of four managers, it shows the importance of the centralization vs. decentralization (C-DC) issue. Then it reviews three papers that tell how to rationally decide the C-DC issue for computing systems.

Next, the discussion broadens to cover more aspects of strategic planning. We will review five papers on strategic planning, all of which apply to DCS design. The papers cover the purpose and content of a strategic plan, stages of computing growth, application control vs. functional control, computing staff reorganization and work unit technology.

Then, Part 4 will look at investment payoff analysis for distributed systems. It contrasts preliminary cost-

(Continued on In Depth/4)

Now we can make your people more productive.



More speed. More flexibility. More performance for a lesser price. Price, in fact, is the only thing we offer you less than IBM.

Our 150 cps serial printer is priced lower than their 120 cps unit, and has more features. Our 650 lpm line printer can be upgraded to an 800 lpm or 1000 lpm line printer on the spot, whenever you need the speed. And our 800 lpm printer upgrades to 1000 lpm just as easily. You only pay for the speed you need when you need it. If you need something else, we offer other printers from 300 to 1500 lpm.

Workstations, serial printers, line printers: nobody offers as many System/34 and System/38 plug-compatible peripherals. All supported by our 250 service specialists at more than 75 locations in the U.S. and Canada.

See for yourself. Call 215-674-3300. Or write Decision Data Computer Corporation, 100 Witmer Road, Horsham, PA 19044.

DECISION DATA®
COMPUTER CORPORATION
makes computing cost less

IN DEPTH

(Continued from In Depth/3)
benefit estimates with detailed life-cycle analyses.

Systematic Design Methods

Because of the many potential advantages, both managers and technicians have begun to apply the DCS concept. Their results have been mixed. Part of their problem is that no widely accepted standard or method of design exists for distributed systems. Today's technology offers such a wide spectrum of design alternatives that it seems almost impossible to properly analyze the trade-offs.

Contributing to the problem are active debates over DCS definitions and over DCS advantages and their counterpart disadvantages. This confusion comes on top of older, still unsolved, costly problems such as software reliability, data security, system maintainability and equipment standards. With so many problems to consider together, designs frequently fail. Even if a system doesn't fail, its designer can't be sure his choice is optimal. What he needs is dependable design methods and guidelines.

Part 4 will present guidelines for DCS design and development methodologies. It will begin with criteria for selecting or assembling a system design methodology, a model list of steps for design at a strategic level and an example of a high-level DCS strategy analysis. Next, it will present two comprehensive, quantitative design methodologies for a DCS. Finally, it will examine the idea that DCS design is best treated as an iterative, experimental process.

Technical Subspecialties

This series discusses distributed computing from general management viewpoints, particularly the viewpoint of a strategic planner. It does not discuss design tactics for the many technical aspects of a DCS. Details of the technology are beyond the scope of this survey. The following guidelines are offered for managers and technicians who wish to read beyond this series.

Distributed computing presents many challenging technical problems, and DCS research is proceeding rapidly in many areas. Publications seem to fall naturally into one of three areas: multiprocessor architecture, data communications and data base management. Software design could become a fourth area, but today it is nearly impossible to pull it away from the other three.

- **Multiprocessor Architecture.** This category, particularly hardware architecture, covers what many people call "distributed processing." It includes hardware capabilities and interconnection strategies, both intra- and interprocessor. It also includes process partitioning for both operating system and application software. Software distribution is developing into two separate new research areas — distributed or network operating systems and program decomposition.

- **Data Communications.** This category covers the exchange of data between processors as opposed to manipulation of the data. The division between data processing and data communications in a distributed system is fuzzy and may not be desirable in the long run. However, today's designers commonly treat communications functions as a subsystem of a DCS.

- **Data Base Distribution.** Distributed data base management may well be the most difficult area of the three. Each separate part of a distributed data base has all the problems of a centralized data base, and these are well known to be many and difficult. When the data base is separated, there are the additional problems of where to store data, how to find data and how to synchronize the parts.

Several tutorials and surveys cover one or more of these three areas. The following are most complete: Apfe78, Bern78, Cham79, Chu79, Hard78, Info76, Info77, Lars79, Lieb77, Mari79, McQu78, Moha78, OnCL76, Roth77 and Thur79.

Origins

This section has explained the need for better understanding between managers and technicians in order to improve the design, development and operation of distributed computing systems. The next section explains the dual, technical and management origins of distributed computing.

"The conclusion drawn here is that



computers possess large economies of scale. This was stated in the late 1940s by Herb Grosch: The ratio of speeds of two computers is proportional to the square of their costs."

— Martin B. Solomon, 1966

"Grosch's Law has been repealed."

— Robert L. Patrick, 1976

There have always been strong reasons to distribute or decentralize computer systems. Until recently, distribution was blocked by the cost advantage of large central hosts and, in some cases, by a lack of technology. Now, the facts of technology and costs have changed. Computer system architecture is being pushed by technology and pulled by user requirements from centralization toward decentralization [Apfe78].

Microelectronics

Many agree that the push behind distributed processing is the revolution in computer prices and performance made possible by microelectronics. Four separate but related effects are involved:

- **Relative Cost.** Decline in processor cost relative to total computer system costs.
- **Absolute Cost.** Decline in absolute cost of processor power.
- **Applicability.** Increase in applicability resulting from physical changes such as size reduction and better reliability.
- **Capability.** Increase in capability because of greater circuit speeds and use of parallelism. The first effect is strong enough by itself to move computer system architecture toward decentralization. The other three effects accelerate the trend.

Prior to 1970, economies of scale in computer hardware usually dominated design decisions. Analysis and empirical studies supported the popular belief that computer power was approximately proportional to the square of computer cost (Grosch's Law) [Cale79, Shrp69, Solo66, Stre74]. So it was economically advantageous to centralize as much computing as possible on a single, large machine.

Today, nothing as simple as Grosch's Law can adequately describe the relationship between the cost and performance of computers. When processor costs decline as a percentage of total system costs, centralization becomes less advantageous. Computers still exhibit some economies of scale, but other effects also strongly influence design decisions. New communications technology and subsequent networking of computers can achieve some of the advantages of centralization without physical consolidation. Examples of such advantages are integration of function and resource sharing.

User Requirements

Even without changes in price-performance ratios, the growth of large central systems would continue forever. All economies of scale eventually reach growth limits. Centralized computer systems are approaching three limits:

- **User Resistance.** Increasing centralization leads to service stagnation because no computer can be all things to all kinds of diverse users. The user loses control of the computing resource and must accept a general class of service rather than service tailored to his specific needs.
- **Complexity.** System complexity has risen faster than our ability to manage it. This has happened despite a large investment in tools and techniques for computer performance analysis.
- **Risk.** The consequences of failure of certain central systems have become unacceptable, but the cost of protecting or backing up the systems is also unacceptable.

User resistance develops whenever a computer facility is shared among dissimilar applications. A shared, centralized facility can penalize its users in four different ways [Stre74]:

- **Decreased Throughput and Response.** A shared system may be too crowded for really big jobs, too slow for some interactive jobs and too insensitive to the needs of low priority jobs.
- **Decreased Reliability.** Streeter believes that unscheduled service interruptions occur more often in shared systems than in dedicated ones.
- **Increased Overhead.** Users must

(Continued on In Depth/6)

Key to Success

Intel's integrated dictionary unlocks data management solutions.

Programmer productivity. Application development. Data base design. Project management. Programming standards. Maintenance. Data security, accuracy, integrity. Optimization of resources. Controlled growth.

All of these are priority issues among forward-thinking organizations today. But these are just a few of the issues addressed—and solved—by Intel's Information Resource Management product family.

The key is in Intel's Integrated Data Dictionary, IDD.

Get the big picture.

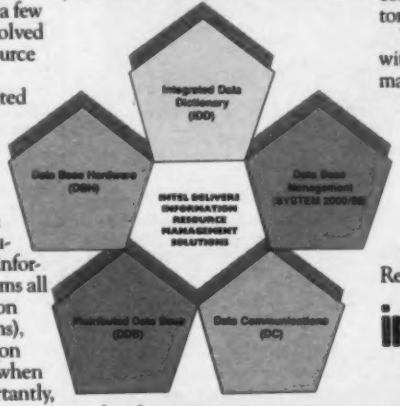
The IDD gives you a detailed, panoramic view of what's happening in your data base environment. By continually monitoring and tracking information (ranging from data items all the way up to entire application systems with multiple programs), Intel's dictionary puts reports on who, what, where, how, and when at your fingertips. Most importantly, you won't need a crystal ball to forecast the impact of change. Impact reports are standard, too.

Streamline application development.

With a wealth of vital information in hand, you can simplify the task of building and fine-tuning new applications. And because the dictionary works intimately with SYSTEM 2000®/80, Intel's powerful data base management system, designers are given extensive data modeling and application prototyping capabilities. Moreover, data items, records, and definitions are easily added, deleted, or modified even after a data base is in full production. And, like all IDD functions, this can be handled on-line or in batch mode.

Enforce standards, communicate, and cut redundancy.

Intel's data dictionary quickly tells you and anyone else involved in data base and application development, what already exists (and



in what form it exists) in your environment. Additionally, the dictionary applies editing, error detection, and correction functions.

Guarantee data security.

Watchdog of your data is IDD's sophisticated security system. With passwords which protect data as far down as the item level, you can be confident that your data remains "clean." You can be confident that unauthorized personnel will not accidentally alter or view sensitive information.

Implement successful solutions.

Intel's Integrated Data Dictionary is an application design aid, a documentation vehicle, a way to enforce standards and procedures, a master reference for determining the impact of change, a tool for controlling growth today and tomorrow.

To examine your key to success with Intel's IDD and other Information Resource Management products, clip the coupon below or call our Market Information Office at 512/258-5171. We'll respond with descriptive brochures, success stories about our customers, plus an invitation to our complimentary seminars on Information Resource Management.

intel delivers solutions.

Europe: Intel Semiconductor (Nederland) B.V., Commercial Systems Division, Oranjestraat 1, 3441 Az Woerden, The Netherlands, 31/3480-11264, Telex 47970 CSD NL

Canada: Intel Semiconductor of Canada, Ltd., 201 Consumers Rd., Suite 200, Willowdale, Ontario M2J 4G8, 416/494-6831

Please forward literature on Intel's Integrated Data Dictionary and other IRM products.

Name_____

Company _____

Mailing address _____

City, State, Zip _____

Telephone ( ) _____

Mainframe(s) installed: IBM (compatible) _____, CDC_____, Univac_____;

Operating system _____

Return to: Intel Commercial Systems Division
P.O. Box 9968; Austin, Texas 78766
ATTN: Market Information Office

IN DEPTH

(Continued from In Depth/5)

share the cost of more complex system features even if they do not benefit.

• **Increased Regimentation.** Centralization means standardization or operating procedures and the working environment.

As centralization loses its economic advantage, its disadvantages become more apparent. Increased centralization means applying the computer to more different kinds of work. So the differences between users grow and emphasize the four disadvantages.

Complexity and risk are the prominent limiting factors when a centralized computer facility is dedicated to one application. For example, McNeil discusses the case of the classic on-line system such as airline reservations [McNe79]. Such a system typically has had a single central computer accessed by remote terminals. The central computer performs or assists the functions of data capture, information retrieval, interterminal communications and access to software resources.

As McNeil says, "Many systems in current operation are of this type, not because it offers the best (or even a good) solution but because it was seen as the only feasible approach at the time they were implemented." In the case of airline reservations, apparent centralization of data remains an essential requirement today. In many other cases, centralization of data is unnecessary and causes problems:

• **Complex Design.** "Complication of the data base as a result of assembling in one place individual sets of data which, by themselves, may not be particularly complex." However, a computer dedicated to one application, such as the airlines case, may be able to use a simplified operating system.

• **Concentrated Risk.** Failure of the central computer means total system failure. A backup system is expensive.

• **Unnecessary Communication.** Data is transported to the center, even when it is needed only at the point of capture. Data is transported immediately, even when it is not needed until much later.

This section has described distributed computing's dual origins in microelectronic technical advances and management limits to the growth of centralized systems. From these origins have emerged differing viewpoints on what comprises a distributed system. The next section analyzes these viewpoints in order to establish a common view between managers and technicians as to what distributed computing is.

Definitions

"He admitted there is a lot of confusion as to what distributed processing means, but said that vendors are aware it allows them to sell a lot of components under one umbrella buzzword [Yasa76]."

"How is distributed computing like pornography? We can't define it, but we know it when we see it [Seam79]!"

There is no universally accepted definition of a DCS. Worse, there isn't even agreement on terminology. For example, as used here, the term distributed computing is fairly new. Instead, most people still say "distributed processing." But that term is too narrow because the processor hardware is only one of the many system design elements that can be distributed. We need a term that can encompass all the distribution possibilities.

Universal adoption of any one definition is unlikely. Distributed computing cuts across so many computer and management sciences that no one definition could serve them all. Many groups, particularly computer vendors, have their own specialized definitions. Still, computer science researchers and others recognize that better DCS definitions are needed to improve communication within the computing community. "A consensus seems to exist that it does not pay to get 'hung up' on definitions. In an academic sense, this is probably true. However, if individuals are going to use terminology like 'distributed systems,' 'distributed computing,' 'distributed processing' and the like, it would do well for those individuals to define what they mean by those terms before using them indiscriminately [Wals78]."

There are some basic ideas about what makes a DCS that seem to be widely accepted, even though people disagree at a more detailed level. So, this section gives two kinds of definitions. First, it gives a general DCS def-

FOR PEACE OF MIND AFTER PURCHASE

The industry standard, smart DM terminals from

Beehive



PRICE
An investment in value

PERFORMANCE
When and where it counts

APPLICATION SUPPORT
Technical assistance available

RELIABILITY
Designed for constant use

SERVICE
Worldwide capabilities

AVAILABILITY
Today and in the future

CORPORATE STABILITY
Unqualified terminal commitment

QUALITY
Depend on it!

FEATURES

DM30 Multi page operation, 16 loadable function keys (optional), auxiliary parallel I/O, extensive formatting and editing capability.

DM20 Editing, buffered transmission, extended formatting capabilities, block and character transmission, buffered auxiliary port, extended function keys.

DM10 Status line, baud rates up to 19,200, addressable cursor, 14 key numeric pad, line drawing capability, self test, time-of-day clock, read terminal status, line lock.

DM1A Function keys, memory lock facility, split screen operation, half intensity, independent auxiliary I/O port, single key cursor control, visual attribute control.

DM 'S' SERIES *Designed primarily for the OEM* The customizable DM 'S' series terminal is predicated upon Beehive's proven standard DM Series. They are designed for applications by OEM and system houses requiring special protocol features and unique value-added applications.

AVAILABLE WORLDWIDE
from quality distributors
Call for location nearest you . . .

TOLL FREE USA (800) 453-9454

BEEHIVE INTERNATIONAL

"A proven competitive manufacturer of smart terminals"

inition, and then it states several specialized ones. The first definition contains the logical intention, or general concept, of a DCS.

The other definitions extend the general definition into four special interest areas. These four special viewpoints might be described as those of the traditional systems analyst, the general manager or system user, the system technician or computer scientist and the management scientist. These viewpoints, of course, overlap considerably.

Geography and Communication

This section states a basic conceptual definition of a DCS and then discusses some of its implications and corollaries. The definition combines four published ones [Boot76, Lieb77, Ravi76, Sche78]:

• **Distributed Computing System Basic Conceptual Definition.** A system in which a single set of related logical computing tasks (programs, applications) is dispersed across two or more separate but cooperating physical computing devices (processors, computers, agents, nodes).

This definition has two important aspects:

• **Geography.** A distributed system has several physically separate parts that are spread over an area [DEC78].

• **Communication.** The parts are related in that they share or pass data among themselves.

The basic definition also implies that each physical node of the system can store data and execute programs, so it can do some jobs by itself. *That is also the rule for determining what is a node of a DCS as opposed to just a component of a node.*

A DCS can be spread over a large or a small area. At one extreme, there are continental and global systems that support tens or hundreds of nodes. Some examples are the Worldwide Military Command and Control System and the U.S. air traffic control system. At the other extreme, a DCS can fit within a single building or a single room, within a single ship or a single airplane. No doubt there will soon be a DCS contained on a single, miniaturized circuit chip. We will concentrate here on the more prosaic business systems that fall somewhere between the extremes.

The nodes of a distributed system communicate with each other. Also, in many cases they communicate with people and may communicate with other systems. The nodes may communicate over either homogeneous or heterogeneous links that vary in capacity and delay. In some cases, communication may be continuous; in others, it is infrequent [Cham79].

Between Extremes

Some authors characterize a DCS as lying somewhere between the extremes of centralization and decentralization. In fact, the geographic spread of a DCS distinguishes it from centralized systems:

• **Centralized Computer System.** A system that has either a single processor or multiple processors so closely coupled that there is essentially no physical separation between them.

At the other extreme, the communication between nodes of a distributed system distinguishes it from decentralized systems:

• **Decentralized Computer System.** A system with physically separate processors that either do not communicate or communicate trivially.

Communications between DCS nodes requires them to be interconnected. Usually the nodes form a network:

• **Computer Network.** A system in which physically separate processors are connected to each other and their users by data communications channels.

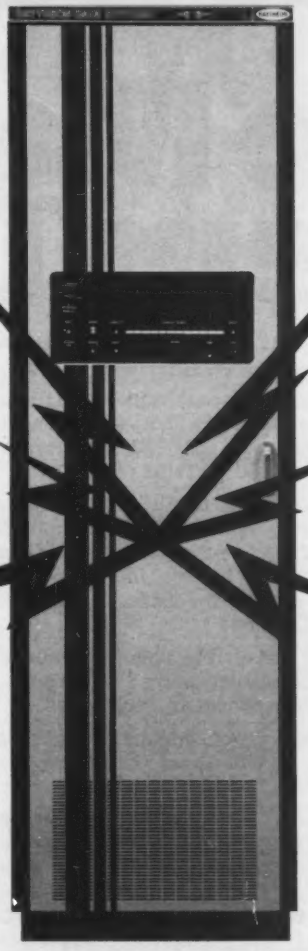
The terms computer network and DCS have similar meanings, but they have a distinct difference in emphasis. The term computer network emphasizes the internodal communication and all but ignores the computing tasks to be done. The term DCS, especially the term distributed processing, reverses that emphasis.

In designing a DCS, it is common practice to think of having two subsystems, one for processing and one for communications. For example, Thurber defines a "computer communications network" as "a collection of host computers (that provide services to either another host or an end user)

(Continued on In Depth/8)

Introducing the New RAYNET/II:

THIS COULD BE YOUR BRIDGE TO SNA.



RAYNET/II data communications systems from Raytheon Data Systems will provide your existing 3270-type bisynch network with increased functionality and performance, and still protect your present investment in terminals for the future.

When you are ready for SNA, your RAYNET/II processor will remain totally compatible, and totally productive.

Your existing terminals become more universal because users can access multiple host mainframes—or multiple applications within a single mainframe—from the same device. RAYNET/II processors eliminate the need for redundant, co-located terminals and duplicate networks.

For more information on RAYNET/II or other RAYNET family members, call the RAYNET marketing director at (800) 225-9874. In Massachusetts, call (617) 339-5731.

Monthly line costs are lowered by the remote line concentration capability in RAYNET/II systems. Lowering communications overhead on host mainframes is another of the ways RAYNET/II processors can improve your network. The network is decoupled from the hosts, and communications functions are handled directly.

RAYTHEON

RAYTHEON DATA SYSTEMS

Intelligent Terminals
Distributed Processing Systems
Word Processing Systems/Minicomputers
Telecommunications Systems

Mini/Comm Division
360 Forbes Boulevard
Mansfield, Massachusetts 02048

IN DEPTH

(Continued from In Depth/7)

and a communications subnetwork that provides communication links between hosts, users or both [Thur79]."

A reason for treating the communications subsystem separately is that it is incidental to the performance of the logical tasks performed by the DCS. Ideally, the communications subsystem should be "transparent" to the users and the application programs. That is, to do their work, they should not have to be knowledgeable about how the communications subnetwork operates.

This two-part functional decomposition — applications processing vs. communications — is an example of a taxonomy, a classification scheme to aid in understanding, analyzing and designing a DCS. Another example comes from Booth. She distinguishes three subsystems: "information processing facilities [central processors and data bases], data communications facilities [concentrators and multiplexers], and endpoint facilities [terminals and local processors]. Together these support the movement of files, programs, data, messages and transactions [Boot 76]."

In summary, this section has defined the distributed computing system concept and discussed some of its simpler implications. However, these simple definitions and classifications are only introductory. They are not adequate for dealing with actual systems. So the following sections present more detailed and specialized ways of describing such systems.

A systems analyst is the closest thing to a neutral party that can be found in the computing community. A systems analyst writes down the functional requirements of a system. That document provides a basis of mutual understanding between system users, designers, developers, vendors and operators. So, for the first of four different detailed DCS taxonomies, this section takes a neutral, functional viewpoint.

Cypser defines two ways to distribute a function across nodes [Cyps78]:

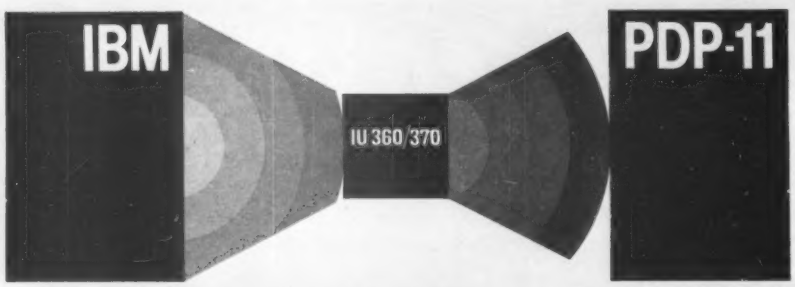
- **Duplicate Function.** Two or more nodes can independently perform the same function.
- **Split Function.** The function is performed piecemeal by separate nodes, but no single node can perform the whole function.

Cypser divides the distributable functions into six sets. Each set is "potentially located within any node" and "potentially related to like functions in other nodes by a set of internode protocols." The six are as follows:

- **Processing Management.** The main operating system controls the execution of applications programs (and other system programs) and their consumption of physical resources.
- **Data Base Management.** An extension of the main operating system controls access to the applications data files and to the hierarchy of devices on which they are stored.
- **Communications Management.** Another operating system extension controls communications between nodes and also between a node's computer and its attached user terminals.
- **Applications Processing.** Applications programs perform the user tasks for which the DCS was designed.
- **Applications Management.** An applications class may be controlled and serviced by an applications subsystem which is functionally an extension of the operating system but runs totally outside it as an applications program.
- **Input/Output Processing.** A node may have attached to it a device that can compute and store data, but is totally dependent on the node, especially for communications between nodes. Such a semi-independent device usually does specialized data entry and retrieval. Examples include intelligent terminals, remote job entry stations and graphics consoles. Booth would classify these as endpoint facilities.

In Cypser's scheme, any node can perform some or all of the six functions. Any function, except perhaps the last one, can be either duplicated, split or both. He visualizes a DCS as an "archipelago of islands of many shapes and sizes."

Classification schemes like Cypser's are needed for stating and analyzing functional requirements when a DCS is being designed. Part 4 will give the details of a functional breakdown proposed by Hal Becker. In contrast to Cypser's horizontal separation of function, Becker's scheme has six vertical levels of function, from the uppermost network level down to the



We Make Them Talk

The PERIPHONICS IU 360/370℠. With it, communications between a PDP-11™ and any IBM mainframe data base is simple.

Proven in over 400 installations worldwide, the IU 360/370 can emulate any IBM controller with one attached I/O device. It can attach to any IBM channel type. Available software makes your RSX-11M™ system appear to the IBM mainframe as a standard 2803/3803 tape drive.

A single PDP-11™ can take up to four IU 360/370's . . . and, communicate with up to four IBM mainframes. The IU 360/370 can emulate any single address IBM channel peripheral, and does not require modification of the IBM operating system. The IU 360/370 is a Unibus™ peripheral, using standard PDP-11™ architecture. State-of-the-art technology and PC board construction give the unit built-in reliability.

If you've got a PDP-11™ and an IBM mainframe database, they probably should be linked. With 30-day availability and a $12,000 price, the Periphonics IU 360/370 makes that link as simple as a phone call.

Periphonics . . . where tomorrow's communications ideas are available today.

Periphonics

PERIPHONICS CORPORATION AN AFFILIATE OF EXXON ENTERPRISES INC.
International Operations Center: 75 Orville Drive,
Bohemia, N.Y. 11716 (516) 567-1000, Telex 5102287310

SM—Service Mark—Periphonics Corporation
TM—Trademarks of DEC

component level. Becker also classifies functions by six characteristics: topology, volume, processing, response, availability and security.

Given the functional requirements, the question is how to distribute the functions. Booth and others describe two basic strategies for distributing functions across the nodes of DCS [Boot76]:

• **Vertical Distribution.** The nodes interconnect in a hierarchy where each node is at least partly controlled by a node at a higher level. (Also called *master-slave* distribution.)

• **Horizontal Distribution.** The nodes interconnect to cooperate as equals. (Also called *peer-peer* distribution.)

Research projects using minicomputers, such as the Defense Department's Advanced Research Projects Agency network (Arpanet) [Thur79], tend to be horizontally distributed. Commercial systems using large mainframes and associated native networking software are usually vertically distributed [Berg78]. However, many designs blend these two types. Also, the choice of strategy has usually been dictated by other factors, such as equipment availability and staff experience.

In many cases, a systems analyst's preoccupation with functional islands has left the end user either high and dry or adrift at sea. This can happen when the analyst fails to properly identify the information needs of the user manager, the manager of the business application that the computing system is supposed to support. So the next section lists features that such a manager might expect in a DCS.

Service Distribution

User managers talk about distributing computing services within the organization. Thierauf's textbook teaches the use of distributed computing in business to information specialists, systems analysts and programmers [Thie78]. He says, "Distributed processing can be defined as 'an approach to placing low-cost computing power, starting at the various points of data entry, and linking these points, where deemed necessary, with a centralized computer via a distributed communications network.'" He states seven "essential characteristics" of a DCS:

• **Three Service Levels.** A three-step implementation approach:

— *First.* Install local, operating-level data entry and inquiry.

— *Second.* Extend to local transaction processing and report generation.

— *Third.* Extend to a network where data transmission interconnects local processors and a central, headquarters facility.

• **Two Processing Modes.** A choice of interactive and batch services to meet user needs at each service level.

• **Smart Terminals.** Preprogrammed or programmable input/output terminals to perform local tasks.

• **Timely Reports.** Management information to meet real-time operational requirements.

• **Data Base Distribution.** Files stored as close as possible to where they are used.

• **Ease of Use.** Simplified programming and interfaces to allow operation and maintenance by nontechnical personnel at local service levels.

• **Local Autonomy.** Operational and management independence and flexibility.

Technicians might argue that these seven points are not essential to every DCS, that they are merely features of some such systems. The user managers might reply that any DCS without these features is not worth discussing, that service of this kind is the object of having a DCS, no matter how the system is built physically.

Physical Distribution

Technicians talk about distributing physical components of a computing system. In contrast to Thierauf's seven essentials, Enslow lists five necessary parts of a working research and development definition of distributed computing [Ens178]:

• **Multiple Resource Components.** Multiple general-purpose, dynamically assignable physical and logical resources.

• **Components Physically Distributed.** Separated physical and logical components that communicate through a network using a two-part cooperative protocol.

• **Integrated System Software.** A high-level operating system that uni-

(Continued on In Depth/10)

Abend-AID©
now over
750
USERS.
WHY?

Abend-AID is the only sensible way to handle abends.

DIRECTORS
ABEND-AID will increase productivity and lower the cost in all areas of your data processing installation.
The product will produce hard dollar savings in excess of its cost in less than one year.

DATA BASE ADMINISTRATORS
ABEND-AID will simplify IMS development by providing complete diagnostic support for both IMS Batch and IMS On-line systems.

TECHNICAL SUPPORT
ABEND-AID will improve the performance of your CPU by eliminating the resources required to produce large memory dumps.
It will also reduce the time required of your staff in assisting with the resolution of application program abends.

OPERATIONS
ABEND-AID will produce immediate savings in the use of paper, ribbons, toner, etc.
The use of the product will also reduce printer time and increase your computer throughput.
ABEND-AID's English diagnostics greatly reduce the time spent on job recovery.

SYSTEMS and PROGRAMMING
ABEND-AID will shift the analysis burden from the programmer to the computer and will virtually eliminate the use of large memory dumps.
ABEND-AID contains comprehensive support for COBOL, PL1, ASSEMBLER, and FORTRAN.
ABEND-AID will reduce both your debugging time and the time required for test turnaround.

FREE SMF ANALYSIS
Call us at 800-521-9353 (In Canada call 313-559-9050).
We can provide you with our Free SMF Analysis Tape which will produce a report detailing the cost savings of using ABEND-AID in your particular organization. We also offer a 30 day trial of ABEND-AID at no charge.

TOMARK
29433 Southfield Road
Southfield, Michigan 48076
(313) 559-9050

ABENDABENDABEND
ABENDABENDABEN
ABENDABENDABE
ABENDABENDAB
ABENDABENDA
ABENDABENDA

aid

Another Service of Compuware Corporation

IN DEPTH

(Continued from In Depth/9)

fies the components.

• **Simple User Interface.** Transparent system organization where users can request services without naming serving components.

• **Cooperative Component Autonomy.** Highly autonomous physical and logical resources that together follow a master plan.

The last two points are similar to Thierauf's last two.

Management scientists talk about information resource management and organizational design. A distributed computing system should be designed to match the organization it supports. Poppel, a management consultant, defines the general DCS design problem as how to place computing resources and management control at selected levels within the organization so as to best match the information flow and reporting requirements [Popp79]. This requires a view from the top of the organization. Someone must check that the design supports the organization's long-term strategy.

The three DCS viewpoints presented above — those of the systems analyst, user manager, technician or computer scientist — are each too limited by themselves to see the entire problem. Systems analysts often fail to understand the business and organizational environment. Users can select a good design for their local environment. But because they lack technical expertise, they often select a design that eventually proves to be incompatible with other systems in the larger organization. Technicians become involved in complex hardware and software selection questions that obscure important human issues.

Management scientists seem to come closest to taking the viewpoint of top management. They tend to agree that a business organization's key resource is information. They try to design systems to improve the content, accuracy, timeliness, accessibility and usability of information. In the context of distributed computing, management scientists focus on how to distribute the data base.

Slonim, Schmidt and Fisher define a taxonomy for data base distribution [Slnm79]. They divide distributed systems into 11 forms. First, there are three basic forms:

• **Centralized.** The organization maintains its entire data base at a single location, a single DCS node.

• **Partitioned.** The organization decentralizes its data base, dividing it among several nodes.

• **Replicated.** The organization duplicates its data base, in total or in part, at some or all of the system nodes.

The centralized form assumes that data base management software and hardware is homogeneous at that node and that data definitions are compatible among applications software. These conditions might or might not also hold in the partitioned and replicated forms. Thus, the authors distinguish four overlapping real-world cases:

• **Heterogeneous Software.** The organization uses a number of different data base management systems (DBMS) involving different data models, data definition languages, data manipulation languages and data formats.

• **Heterogeneous Hardware.** The organization uses different computer architectures at different nodes, and probably different hardware vendors.

• **Homogeneous Software, Heterogeneous Hardware and Data Compatibility.** The organization uses the same DBMS on different computers. But the existence of standard internal representations, such as Ascii and Ebcdic, make code conversion easy.

• **Heterogeneous Software, Heterogeneous Hardware and Data Compatibility.** The organization has a very complex system.

The authors discuss each of these four cases for both the partitioned and replicated forms, giving eight more forms, for a total of 11.

Product Positioning

To position computing products in the marketplace, vendors use loose definitions that blend the management and technical viewpoints. For example, Fusco defined distributed processing as "the ability to perform processing functions at many locations in a variety of ways, ways that are tailored to suit each user's special applications [Fusc78]." To Fusco, "distributed" meant "an intelligent device with com-

DEC's Communicating Word Processors from

HAMILTON

The Digital WD80 Series Word Processor



Immediate Delivery!

Reliable and proven DEC hardware with sophisticated yet easy-to-use software. Great flexibility enables stand-alone use or communication to other word or data processing systems. Advanced text editing capabilities complemented by powerful list processing package.

DEC's PDP-based 80 series provides the ideal solution for any small work group with either word processing or word and data processing needs. Includes single-user or two-user systems and offers unparalleled flexibility in work load distribution.

FEATURES:
- VT100 word processing video terminal(s)
- Diablo letter quality printer mounted in attractive media-storage cabinet. Output 540 words per minute
- RX02 diskettes. Provides 200-425 pages of storage

OPTIONS:
- Communications packages provide network facility to DEC word processors; PDP8, PDP11 based minis; and Time-sharing bureaux etc.
- COS310 Dibol operating system
- Single sheet feeder attachment
- DEC draft printer. Output 2160 words per minute
- Sound enclosure for printer

Hamilton, as established leaders in sales and rentals of computer and word processing systems, offer rentals of 3, 6 and 12 months, which include complete installation and ongoing service. Additionally, we include well-documented, intensive and thorough training for your personnel, and full, continuing support.

Call or write for pricing, literature and further information.

ALL RENTALS INCLUDE MAINTENANCE.
PURCHASE OPTION LEASE PLAN:
40% rebate of rentals applies against purchase price

HAMILTON

Hamilton Rentals
One Penn Plaza, New York 10119

212-695-1936
TOLL FREE 800-223-2430

LONDON PARIS DÜSSELDORF TORONTO

munications linked to a host processor in a network." Of course, it has been suggested that some mainframe manufacturers see a DCS only as a bridge to an even larger centralized site, but that strategy seems very weak today.

The many minicomputer vendors see distributed computing as an alternative to a single centralized computer. They argue that large computers are good for batch work but are inefficient and expensive for interactive and real-time work. They say that small computers do best at time-sharing and transaction-processing activities such as order entry and inquiry handling. To these vendors, distributed computing means minicomputers.

Some take a middle position and define distributed processing as "two or more processors altering or managing data in a cooperative manner [Span78]," where both large and small processors are used. They say that large, centralized, batch systems will continue to dominate, but also that minicomputers are ideal for offloading selected functions from a central computer and distributing them to work units. This is a likely position for a manufacturer of both large and small computers.

Berglund tried to cut through the confusion that results from different vendors using different labels for the same parts of a distributed system [Berg78]. He compared three network architectures: IBM's Systems Network Architecture (SNA), Univac's Distributed Communication Architecture (DCA) and NCR Corp.'s Distributed Network Architecture (DNA). He was unable to find many equivalents because the vendors' design concepts are different and few labels match. But he found many similarities and provided a good tutorial.

Saxton and Edwards note the tender-trap nature of network architectures. "By providing a uniform and standard structure for all present and future elements of a computer-communications system, network architectures allow users to expand their data processing operations — whether centralized or distributed — in a controlled, evolutionary manner. Since it gives users a reason to stay with one vendor's products systemwide, network architecture is also a useful ploy for mainframers who are increasingly feeling the pressure from independent vendors of intelligent and multi-function terminals . . . In fact, despite the user benefits promised by network architectures, vendors have embraced the concept much more rapidly and completely than users [Saxt78]."

Today, DCS brings to mind computers, computer peripherals and communications networks. But the concept will expand to office equipment for word processing, facsimile transmission, copying, photocomposition and other message handling [Wals78, Yasa75]. These products use the same micrologic technology as computers, but they are not yet fully integrated with computers. Their vendors talk about "office automation" instead of distributed computing. But the convergence of office equipment and computers is inevitable because it enhances the capabilities of both.

We see now why there is no single, simple definition. With only a simple definition, talk about distributed computing can get very confused. The confusion comes from the dimensions or degrees of distribution. A complete DCS definition needs two sets of dimensions, one for managers and one for technicians.

Managerially, the organization that builds and runs a DCS can be either centralized or decentralized. Rockart states three dimensions for organizational design of the information system function [Rock77]:

- **Management.** Strategy, planning, standards and supervision.
- **Development.** Design, implementation and installation.
- **Operation.** Execution, maintenance evaluation and change.

Each dimension has the same range, from total centralization to complete decentralization. Design, implementation and control make up a similar trichotomy. Technically, Enslow distributes a system along three physical dimensions [Ens178]:

- **Hardware.** From a single processor with only single control, logic and memory units to multiple computers with multiple units.
- **Control (the Operating System).** From a single fixed control point to

(Continued on In Depth/14)

Wang's New 2200 LVP: The multi-user computer that stands alone.

In its under-$20,000 price range, Wang's new 2200 LVP computer outclasses the competition with a unique combination of:

Powerful Performance. A true multi-terminal, multi-processing system, the 2200 LVP utilizes the same architecture and bus structure that has made the Wang 2200 one of the fastest and most popular small computers in the industry.

Advanced Disk Storage Technology. The 2200 LVP combines new fixed disk and dual-sided, double-density diskette drive technology for greater reliability, performance, and portability.



Comprehensive Data Entry/File Management. The LVP's versatile data entry terminal and I.D.E.A.S. data management software make the system ideal for clustered data entry and program development applications.

Flexible Telecommunications. For larger companies with distributed processing requirements, the 2200 LVP supports a full line of asynchronous and bi-synchronous telecommunications in a variety of industry-standard protocols.

Easy System Expansion. Modularly add terminals and all the memory and printers you're likely to need as your business grows. And with full software compatibility, you can be sure your investment is protected.

The Wang 2200 LVP. It stands alone.

☐Tell me more about Wang's 2200 LVP.

Name _____
Title _____
Organization _____
Address _____
City _____ State ____ Zip ____
Phone _____

Send to: Wang Laboratories, Inc.
Lowell, MA 01851 (617) 459-5000

WANG

Making the world more productive.

© 1980 Wang Laboratories, Inc., Lowell, Mass. 01851

DP150/CW1080


Word Processing
COBOL Processing
Remote Batch
PWS
MFE/V
Source Data Entry
3270 Central Inquiry

The Multifunction Edge

Today's interactive data processing system from Four-Phase.

It's the best way to store COBOL and word processing for tomorrow.

One system does the work of several with our powerful Multifunction Executive.

The MFE/IV™ Multifunction Executive system from Four-Phase is source data capture with a future. It's the economical system that will meet your distributed data processing and 3270 central inquiry requirements, and it's available right now.

Then, as soon as your needs dictate, the Multifunction Executive system lets you combine distributed data processing, standalone COBOL processing, word processing and program development tools to suit the changing job requirements of users at clusters of remote displays. All the primary office computing functions. All on one system. All at once.

Easy to install and use.

MFE/IV systems are up and running in weeks with field-proven hardware and software packages that you control but don't have to develop. Optional prompting from job definition through formatting reduces training time and simplifies operations.

IBM-compatible communications.

Your MFE/IV system is supported by IBM-compatible interactive and batch communications today and with SNA and SDLC whenever you're ready. Four-Phase provides nationwide service and software support.

Ask for a demonstration.

Let us show you how to get The Multifunction Edge. For a personal demonstration, return the coupon below or call your nearby Four-Phase Systems office. Also available through Four-Phase Systems, Ltd. in Canada and distributors throughout the world.

Yes, tell me more about **The Multifunction Edge.**

☐ Please arrange a demonstration.

☐ Please send information.

My present mainframe and terminals are _____

_____

Name _____

Title _____

Company _____

Address _____

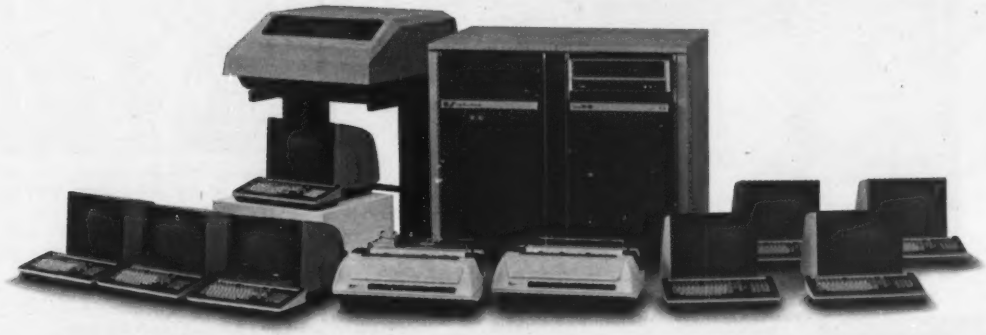
City _____ State _____ Zip _____

Telephone _____

Four-Phase Systems, Inc. MS 42-1B8-M
10700 N. De Anza Blvd., Cupertino, CA 95014
Telephone 408/255-0900

CW 10/6/80

MFE/IV is a trademark of Four-Phase Systems, Inc.



Four-Phase Systems
The Distributed Processing Company

IN DEPTH

(Continued from In Depth/11)

multiple, heterogeneous, migratory control points.

• **Data Base.** From a single centralized file and directory to partitioned file with no central directory.

Enslow rejects some parts of his technical space as not really being distributed computing. However, not everyone is so particular. Some say DCS for nearly any system that is neither completely centralized nor completely decentralized.

The common factor is "the use of multiple cooperating computing elements to perform jobs that were heretofore performed on [single] large [centralized] computers or not at all [Lieb77]." The "key element is . . . the communication that goes on between programs [Sche78]." When the communication level reaches a certain threshold, that makes a DCS.

Next week: Advantages and disadvantages.

REFERENCES

• *Apfe78* H. Apfelbaum, R.C. Case, J.E. Juliussen, B. Shriver, H.S. Stone, J.E. Thornton, "Computer Systems Organization: Problems of the 1980s," *Computer*, September 1978, Pg. 20.

• *Berg78* R.G. Berglund, "Comparing Network Architectures," *Datamation*, February 1978, Pg. 79.

• *Bern78* P.A. Bernstein, J.B. Rothnie and D.W. Shipman, ed's, *Tutorial: Distributed Data Base Management*, New York, IEEE Computer Society, 1978.

• *Boot76* G.M. Booth, "Distributed Information Systems," *Afips Conference Proceedings, 1976, National Computer Conference*, Pg. 789.

• *Cale79* E.G. Cale, L.L. Gremillion and J.L. McKenney, "Price/Performance Patterns of U.S. Computer Systems," *Communications of the ACM*, April 1979, Pg. 225.

• *Cham79* G.A. Champine, "Current Trends in Data Base Systems," *Computer*, May 1979, Pg. 27.

• *Chu79* W.W. Chu and P.P. Chen, ed's, *Tutorial: Centralized and Distributed Data Base Systems*, IEEE, 1979.

• *Cyps78* R.J. Cypser, *Communication Architecture for Distributed Systems*, Addison-Wesley, 1978.

• *DEC78* Digital Equipment Corp., *Distributed Systems Handbook*, June 1978.

• *Ens178* P.H. Enslow Jr., "What Is a 'Distributed' Data Processing System," *Computer*, January 1978, Pg. 13.

• *Frnz76* D.R. Franz, "An Evaluation of Computer Program Design Methodologies from a Perspective of the Management Discipline," *Proceedings, 12th Annual Meeting, Southeastern Chapter, the Institute of Management Sciences*, Clemson U., S.C., October 1976.

• *Fusc78* G.P. Fusco, "SNA and Distributed Systems," *Data Management*, January 1978, Pg. 60.

• *Hard78* W.T. Hardgrave, "Distributed Data Base Technology: An Assessment," *Information and Management*, August 1978, Pg. 157.

• *Info76 Distributed Systems*, Infotech State-of-the-Art Report, Maidenhead, Berkshire, England, Infotech International, Ltd., 1976.

• *Info77* J. Hosier, ed., *Distributed Processing Vol. 1: Analysis and Bibliography, Vol. 2: Invited Papers*, 1977.

• *Keen78* P.G.W. Keen, M.S. Scott Morton, *Decision Support Systems: An Organizational Perspective*, Addison-Wesley, 1978.

• *Lars79* R.E. Larson, ed., *Tutorial: Distributed Control*, IEEE, 1979.

• *Lieb77* B.H. Liebowitz, J.H. Carson, ed's, *Tutorial: Distributed Processing*, IEEE, 1977.

• *Mari79* M.G. Mariani, D.F. Palmer, ed's, *Tutorial: Distributed System Design*, IEEE, 1979.

• *McNe79* J. McNeil, "Distributed Computing," *Electronic Progress*, Spring 1979, Pg. 20.

• *McQu78* J.M. McQuillan, V.G. Cerf, *Tutorial: A Practical View of Computer Communications Protocols*, IEEE, 1978.

• *Moha78* C. Mohan, "An Overview of Recent Data Base Research," *Data Base* (ACM/SIGMod), Fall 1978, Pg. 3.

• *OnCL76 Distributed Processing*, Uxbridge, England, Online Conference Limited, 1976.

• *Popp79* H.L. Poppel, "Business Equipment: Technology That Forces Executive Decisions [an Advertisement]," *Forbes*, Nov. 12, 1979, Pg. 132.

• *Ravi76* C.V. Ravi, "The Structure and Characteristics of Distributed Systems," *Proceedings of the Second International Conference on Software Engineering*, San Francisco, October 1976, Pg. 133.

• *Rock77* J.F. Rockart, C.V. Bullen, J.S. Leventer, [Draft] *Centralization vs. Decentralization of Information Systems: A Preliminary Model for Decision Making*, MIT, Cambridge, Mass., April 1977.

• *Roth77* J.B. Rothnie, N. Goodman, "A Survey of Research and Development in Distributed Data Base Management," *Proceedings of the Third International Conference on Very Large Data Bases*, IEEE, Oct. 6-8, 1977.

• *Saxt78* W.A. Saxton and M. Edwards, "Datacomm Directions: Distributed Processing Revisited," *Infosystems*, July 1978, Pg. 108.

• *Sche78* A.L. Scheer, "Distributed Data Processing," *IBM Systems Journal*, 1978, Pg. 324.

• *Seam79* J. Seaman, "Computer Decisions Round Table: Implementing DDP Successfully – Part I," *Computer Decisions*, January 1979, Pg. 16.

• *Shrp69* W.F. Sharpe, *The Economics of Computers*, Columbia Univ. Press, 1969.

• *Slnm79* J. Slonim, D. Schmidt, P. Fisher, "Considerations for Determining the Degrees of Centralization or Decentralization in the Computing Environment," *Information and Management*, February 1979, Pg. 15.

• *Solo66* M.B. Solomon Jr., "Economies of Scale and the IBM System/360," *Communications of the ACM*, June 1966, Pg. 435.

• *Span78* C.W. Spangle, "Impact of Distributed Systems," *Data Management*, January 1978, Pg. 15.

• *Stre74* D.N. Streeter, "Chapter C: Locations/Allocation Problems" in "Section 3: Issues of Management," *The Scientific Process and the Computer*, Wiley, 1974.

• *Thie78* R.J. Thierauf, *Distributed Processing Systems*, Prentice-Hall, 1978.

• *Thur79* K.J. Thurber, ed., *Tutorial: Distributed Processor Communication Architecture*, IEEE, 1979.

• *Wals78* M.E. Walsh, "MIS – Where Are We, How Did We Get Here, and Where Are We Going?" *Journal of Systems Management*, November 1978, Pg. 6.

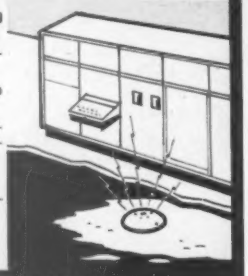
• *Yasa75* E.K. Yasaki, "Toward the Automated Office," *Datamation*, February 1975, Pg. 59.

• *Yasa76* "It's a Question of Experience," *Datamation*, September 1976, Pg. 160.

AVOID DOWNTIME!

WATER *ALERT*®

. . . FOR COMPUTER AREAS



Warns you of water leakage in sub-floor wiring areas.

- Produces a loud, intermittent alarm when activated by presence of water.
- Completely self-contained . . . no wiring, no connections.
- Early water detection (1/64" water film activates alarm) provides maximum time for corrective action.
- 24 hour per day monitoring.
- Options include remote indicator, remote flashing light, and automatic telephone dialer.

8 Models from $59 - $110

Call or write for complete information.

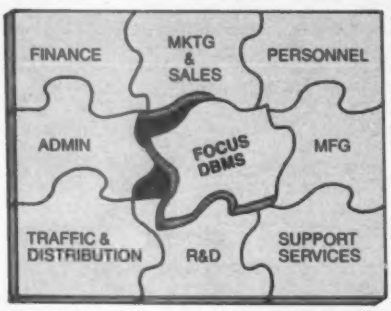
Dorlen Products

Division of Electro Consultants, Inc.
7424 W. Layton Ave., Milwaukee, WI 53220
Phone 414 282 4840

FOCUS: the solution to the information control puzzle.

FOCUS is the most complete user-oriented information control system available today. Using English-language sentences, you can both prepare reports and manage data online. And with FOCUS you can also develop entire applications faster than with any other system.

Operating interactively (CMS/TSO) on IBM 370, 4300, or compatible mainframes, FOCUS combines these 5 key functions into one system:



1. Report generator & query language—solve your ad hoc problems and prepare standard reports with full formatting and calculating.

2. Relational file structures—gain flexibility and reduce redundancy when data is stored in FOCUS shared structures which are linked by common fields.

3. Database management & updating—attend to all your data-capture, data-validations and add-delete-change maintenance tasks.

4. Reports from existing files—instant interface with all your current files from simple sequential to complex structures such as IMS, IDMS, VSAM and ISAM.

5. Graphs, financial models, formal statistics—decision-supporting data in understandable graphic hard copy or CRT display.

Over 400 major companies, institutions and government facilities are using FOCUS to speed up their data analysis. Among them are: J.C. Penney, ITT-Continental Baking, Merrill Lynch, United Airlines, Yale University and the U.S. Army Corps of Engineers.

FOCUS can save you time, effort and money. For more information, call or write for our brochure.

FOCUS

Information Builders, Inc., 1250 Broadway, New York, N.Y. 10001 (212) 736-4433

FOCUS is also available on a service bureau basis through the international network of Tymshare Inc.



Dr. Robert W. Shirey is a group leader at The Mitre Corp. in McLean, Va.

Since 1964 he has held positions at the University of Wisconsin's Social Systems Research Center and U.S. Army Mathematics Research Center, The Rand Corp., Computer Sciences Corp. and Booz, Allen & Hamilton.

In addition to his responsibilities at Mitre, Shirey teaches in the Management Science Department of George Washington University.

Shirey holds B.S., M.S. and Ph.D. degrees from the University of Wisconsin at Madison and an M.B.A. from the University of Southern California.

Management Aspects Of Structured Design

By Meilir Page-Jones

Structured design is a system development technique that has an impact not only on those who use it but also on those who manage it.

However, the topic of management is a monumental one. There are library shelves filled with fat volumes devoted to management problems, such as how to estimate this, coordinate that and determine the critical path of the other. So here I will concentrate on how to manage structured design and, more specifically, how structured design can help with the thankless task of managing a software project.

Structured design makes its first impact on an organization simply by being introduced. It will require everyone to adapt to the structured approach and to abandon long-established habits. This change in design procedure tends to provoke one of three reactions in people:

- Inertia, fear of inadequacy and unthinking rejection of the new ideas (better the devil you know than the devil you don't know).
- Wild and uncritical espousal of the new ideas (better the devil you don't know than the devil you do).
- A circumspect and cautious acceptance of the new ideas.

Interestingly, all three of these reactions can be summarized as, "Well, you know, *I've* been using all these techniques for years; I just didn't have a name for them." This is never completely true and is usually almost totally false.

The third attitude, that of benign skepticism, is the one all people — technical and managerial alike — should adopt. Innovations are not always good; and not all new techniques will be applicable to your shop. A good manager should encourage the third attitude in his technicians and he should offer them the chance to accept or reject structured design for themselves without heavy managerial pressure. People don't like to have anything foisted upon them, so if you provide an opportunity to review new ideas, you will increase the chances that the ideas will be palatable.

There are two further tangible benefits: People learn better voluntarily, and they will probably weed out any truly inapplicable ideas during their review.

A managerial decision that is crucial to the acceptance of structured design is the choice of a good pilot project. Here, first of all, are some guidelines for a good pilot:

- Choose a small, fairly simple project. A good candidate for a pilot project is one that requires four person-years and lasts six months to one year. The project has to be long enough to be respectable, but short enough to provide reasonably early feedback.
- Choose a system that is not critical to the well-being of your organization. A sword of Damocles hanging over the designers' heads is likely to send them scurrying to the safety of their old

(Continued on In Depth/18)

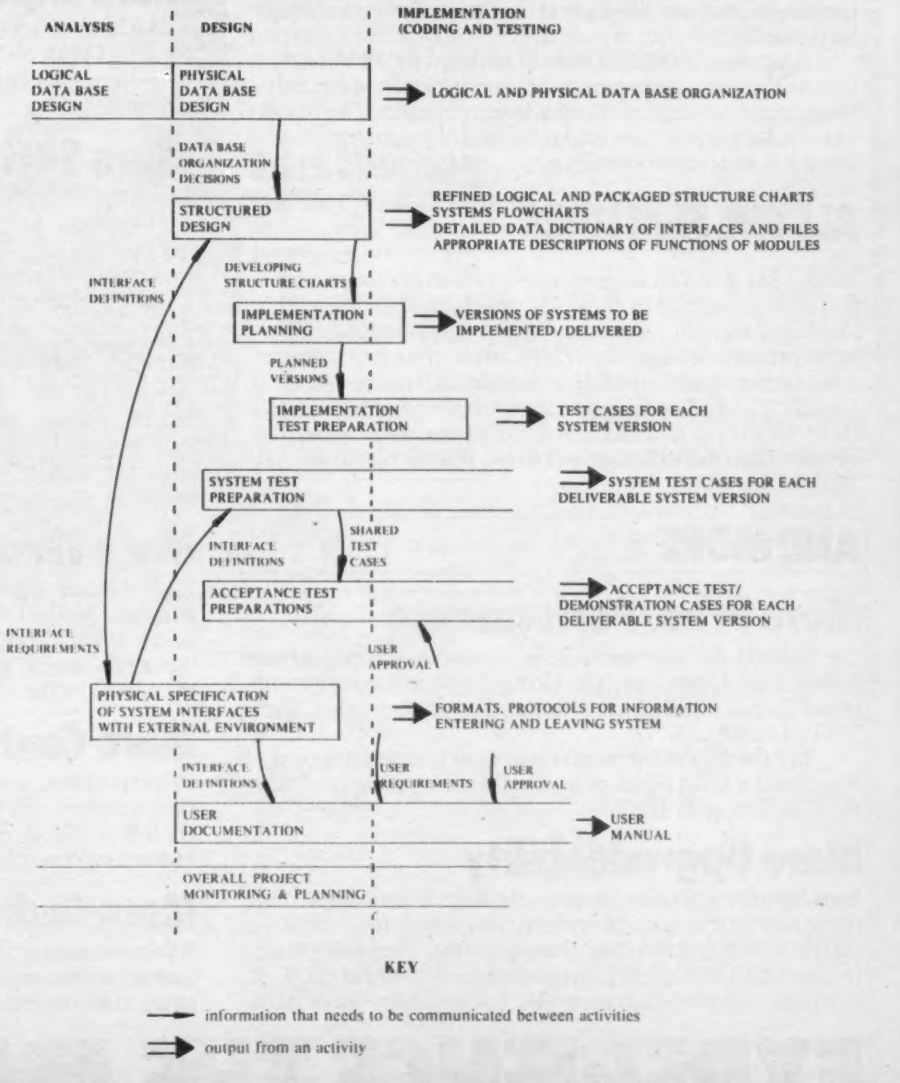


Figure 1

Reprinted with permission. Adapted from Chapter 14 of The Practical Guide to Structured Systems Design *by Meilir Page-Jones. Copyright © 1980 by Yourdon, Inc., 1133 Avenue of the Americas, New York, N.Y. 10036.*

MAGNUSON'S ALL THE 4331 AND MORE,

Some computer manufacturers handle competition by meeting it head-on. Magnuson Computer Systems simply surpasses it.

Magnuson's M80/31 system matches the IBM 4331 Group 2's features, then adds features typically found only on much more powerful and expensive computers. The result: more value when it comes to price and more capability when it comes to performance.

ALL THE FEATURES

IBM's 4331-2 has an impressive list of features for any system in its performance class. Compatibility with the 4331. Field upgradeability from the 4331. A minimum of 1 million bytes of main storage. Up to 256K bytes of control storage. A list of microcode assists that includes 370 mode and VSE/ECPS. And operating system support that includes DOS, DOS/VS, and DOS/VSE (370 and native mode). That's where the 4331 Group 2 stops. But it's where the M80/31 begins.

AND MORE

More Price/Performance

The M80/31 doesn't merely outperform the Group 2, it beats it by at least 15 per cent. The Group 2 gets a 19.6 on International Data Corporation's relative performance index. The M80/31 rates a 23.

But the M80/31 wins on more than just performance. It received a 170.4 performance/price rating, compared with the 4331 Group 2's 122.5.

More Upgradeability

Your M80/31 will never become obsolete. If your application outgrows your Magnuson system, you simply upgrade it. And you do it with a simple board swap in your computer room, because all M80s are field upgradeable. What kind of upgrade is available when your 4331 Group 2 runs out of steam?

More Expandability

And where do you go when your 4331 Group 2 runs out of capacity? With an M80/31, you can go right up to 8 million bytes of main memory. That's twice the capacity of the Group 2.

More Software Support

Our M80/31 supports more operating systems than the 4331 Group 2 does. The M80/31 fully supports MVS—the Group 2 doesn't—and the M80/31 supports all the operating systems you'll find on the 4331 Group 2: VS1, VM370, DOS, DOS/VS, and DOS/VSE.

More Channels

The M80/31 provides a lot more channel capacity: one byte channel and five additional channels—two standard and three optional—that can be configured in any mix of byte, block and selector channels. The Group 2 gives you just four channels—all optional.

More Throughput

High channel speed means high throughput. All those standard M80/31 channels run at 2.5M bytes/second. The best a 4331 Group 2 can do is 1.85M bytes/second, and that's only on an optional block channel. The rest run at half the M80/31's speed.

More Control Storage

When it makes sense to put your frequently used instructions in microcode to speed execution, the M80/31's large control storage can help. It offers from 48K to 256K bytes of high speed control storage. The 4331 Group 2 stops at 48K.

More Cache Memory

If you want the option to use cache to speed up program execution, you want a lot of it. The M80/31 gives you 16K bytes to work with. The 4331 Group 2 gives you 8K bytes.

EXPERIENCE THE MAGNUSON

NEW YORK AREA USERS:
SEE THE MAGNUSON
DIFFERENCE IN ACTION
ON OCTOBER 9. Call John Williams at
(212) 599-0883 for more information.

NEW M80/31: -2 FEATURES FOR LESS



FOR LESS

Less Cost

The M80/31 is economical on at least three counts: it costs less to buy, less to keep, and less to operate.

Less to buy because our Strategic Architecture lets us get performance through smart design, not unproven technology. So we can offer a 1 million-byte M80/31 system with a console, a byte channel, and two block channels for $135,000 or $4,500 a month under a two-year lease. A similar 4331 Group 2 costs $166,000 or $5,000 a month.

Less to keep because you'll avoid the huge investment of replacing your existing system with a new one. That's because with the M80/31, you simply expand and upgrade the same system—on-site—when you need more capacity.

Less to operate because our compact version takes about half the floor space of a 4331 Group 2.

Less Waiting

You can have your M80/31 on your receiving dock just 30 days after you order it. So your application can run next month.

MORE FOR LESS

If you're evaluating a 4331 Group 2, you have all these additional reasons for evaluating a Magnuson M80/31. They add up to more capability for less money.

We'd like to help you do it. Just fill in the coupon below and we'll send you more information about the M80/31 in the return mail.

MAGNUSON COMPUTER SYSTEMS

DIFFERENCE

Magnuson Computer Systems, Inc.
2902 Orchard Park Way
San Jose, California 95134

- ☐ I'm interested! Send me more information on your M80/31.
- ☐ I'm really interested! Send me more information on the entire M80 line.
- ☐ I'm interested and in a hurry! Have a sales representative call.

Name _____

Title _____

Company _____

Address _____

City _____

State _____ Zip _____

Telephone _____

CW 106

IN DEPTH

(Continued from In Depth/15)

habits if things go awry. Using a new technique is nerve-racking enough without the developers' knowing that if their project fails, so will their careers.

• Don't put your people on too many simultaneous learning curves. I remember a project to develop a property and machinery financial accounting system, which was to run on an IBM 370 using CICS, IMS and Cobol. The development techniques were structured analysis, structured design and structured programming.

Not only was there almost no prior experience with using structured anything, but there was very little familiarity with IMS, CICS or on-line systems in general. Many of the Cobol programmers were erstwhile assembler programmers who were hurriedly retrained. In addition, none of the analysts had much knowledge of taxation and depreciation.

You can guess the denouement of that project. However, before it fell over the cliff, a panicked management doubled the development staff by hiring consultants specializing in each of the unfamiliar territories (they even hired a Cobol consultant!). However, adding too many diverse consultants to a project has the same effect as pressing down an automobile gas pedal. Whichever way the project is going, hiring the consultants will make it go faster in the same direction. So the project accelerated over the edge while everyone wondered who should be in the driver's seat.

A debacle is usually followed by a search for a scapegoat, which in this case was the newest technique, with the fewest consultants to defend it: the structured development techniques. The final report — the epitaph — on the project said, "Clearly the structured development methods are inapplicable to our environment ... We recommend that structured programming henceforth be banned [sic!] from the DP Applications Development Section."

• Choose normal people for the pilot project. If you pick a team comprising all the hottest designers and programmers in your shop, people will think that structured design is only for superstars. Also, when the project is over, structured design will receive little credit for any success.

• Choose committed people who won't throw up their hands at the first obstacle. The people on the team should be prepared to persevere with structured design even though, as is the case with most new techniques, its application might not always go perfectly smoothly.

Duration of Structured Activities

Although it is hard to generalize, these are the proportions of time you can expect each major activity of development to take: structured analysis, 40%; structured design, 25%; with structured programming, implementation and testing filling the remaining 35% of the development time. (These percentages were obtained in studies conducted by two large utility companies and a major insurance company.)

In a very complex project, analysis may take more than 40% in a large but straightforward project, analysis and design together may take only 50% of the total time.

These figures indicate that structured development is a very front-loaded process, since more than half the time allotted to the project may have elapsed before one line of code has emerged. If this worries you, remember what I said in Chapter 12 about implementation: When code is at last written, it should be good, working code.

Activities of Structured Design

Although as a manager you may not be involved in the detailed techniques of structured design, it is important that you have a solid overview of the chief activities of this phase and what deliverables should be produced. The major activity of structured design is the derivation of the structure chart. The designers are unlikely to accept the first structure chart produced.

The normal practice is to sketch out three or four skeleton structure charts for each job step in the system. The designers review them and determine which charts can be most easily refined into a good design and then make some modifications and refinements based on structured design criteria

(Continued on In Depth/20)

one for the files.

A Computerworld Special Report on Data Base Management Systems in our October 27th issue.

This special report will explore many of the issues relating to the selection, implementation and organizational impact of DBMS software. It will include:

- User experiences with various systems, pro and con.
- The problems and benefits of using DBMS.
- How do you establish the management function necessary to control the data base?
- How do you plan and insure data independence, integrity and security?
- The future of DBMS.

If you currently use DBMS software, or are planning to buy, this Special Report will be of special interest to you. And if you market DBMS, you'll reach a wide end-user audience here. Ad closing date is October 10th, and your *Computerworld* representative can give you full ad planning assistance. Or, to reserve space for your ad, call Frank Collins at 879-0700.

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Boston	Chicago	New York	San Francisco	Los Angeles
Bob Ziegel	Dave Dolber	Don Fagan	Bill Healey	Jim Richardson
Chris Lee	Bob Ziegel	Mike Masters	Barry Milione	Bob Hubbard
Ed Marecki	Jane Wrightman	Peter Senft	Bob Stetson	Kathy Knox
Kathy Doyle	(312) 782-7565	Candy Kelly	Ruth Gordon	(213) 450-7181
Susan Wolffe		(201) 967-1350	(415) 421-7330	
(617) 879-0700				

"We switched to NCR," says Joseph A. Dee of Brooks Camera, Inc.

DEE:
Brooks Cameras is the largest photographic dealer in Northern California. And we're growing fast. We just outgrew the processing center that had been doing our computer work. We needed faster turn-around. And we wanted to establish our own priorities.

NCR's SWEENEY:
So you went to your own NCR system.

DEE:
Yes, but not directly. First, we selected a competing vendor's newly announced system. But as we started to plan, we began to see problems ahead. No tape drive. Perhaps no COBOL. Perhaps no match-up with our sales terminals. And all we could get from the supplier were vague assurances that the problems would somehow disappear. So we switched to NCR. Very fortunately, as it turned out, because our NCR system is up and running. While the other vendor is still not delivering the other system.



Joseph A. Dee (left) is president and chairman of Brooks Cameras, Inc. in San Francisco. Jim Sweeney is his NCR Account Manager.

NCR's SWEENEY:
We are not only delivering, our operating software is fully tested.

DEE:
We had a shirtsleeve session with the NCR software people that was refreshing. They told us exactly where they stood. What we could expect and when. And that's the way it's turning out. They gave us the hard answers.

NCR's SWEENEY:
You liked Migration Path Engineering, too.

DEE:
Our requirements are too unique for us to expect off-the-shelf application software from any supplier. We have every kind of sales transaction. We accept all the regular charge cards as well as our own. We have rentals, repairs and layaways. And our own special promotions. So once we made the investment in our own specialized programs, we wanted to protect it. Even when our growth forces us to move to a larger system. With Migration Path Engineering, NCR can give us that protection.

NCR's SWEENEY:
And finally, you wanted one supplier who would assume responsibility for the entire system from A to Z — including the terminals.

DEE:
You're absolutely right, Jim.

In the NCR office nearest you, there is an account manager like Jim Sweeney who knows both NCR systems and your industry. To learn more about what an NCR system can do for you, phone him at your local office. Or write to EDP Systems, NCR Corporation, Box 606, Dayton, Ohio 45401.

NCR
Complete Computer Systems



IN DEPTH

(Continued from In Depth/18)
such as coupling and cohesion.

If classical analysis rather than structured analysis has preceded structured design, then the designers will probably want to draw some fairly high-level DFDs before they approach development of the structured chart. First, it will give them a better grip on the problem. Second, it may bring to light errors, holes or inconsistencies in the functional specification. Third, it will ease the technical transition from analysis to design.

By the end of design, the function of each module in the structure chart must be described. For a simple module, this description may be in the form of a specification of its inputs and outputs, with a brief statement of what it does to its inputs to obtain its outputs. If structured analysis has been performed, the mini-specifications of the DFD bubbles in most cases will be enough to tell the programmers what the modules do. Where that isn't so, the designers will have to provide further descriptions, probably in pseudocode.

The data dictionary developed during analysis must also be kept up to date with any new data introduced at design time.

An activity of all phases of a structured project that is crucial to the success of the project is the walk-through, which is a review by a small group of people of a product presented by its author(s). The product in a design walk-through, in most cases, would be part of a structure chart. To the project technicians, the purpose of a design walk-through is to anticipate as many problems in the design as possible while they are still only paper tigers. A problem discovered during design can be as much as 10 to 100 times cheaper to correct than the same design problem discovered during production. A walk-through can be thought of as the practical implementation of "a stitch in time saves nine."

To the manager, the purpose of a walk-through is to assess the project based on the reports generated. In the past, a manager has had to determine the progress of a project by measuring the quantity of documents produced. However, as I pointed out in Chapter 2, measurement of quantity is futile if quality is not ensured. The walk-through is not only a tool to improve system quality, but also to communicate the current quality of every part of the system under development.

Parallel Activities

A good manager, like a good cook, has to successfully coordinate many simultaneous activities. In this section, I will briefly describe the major development activities that go on at the same time as structured design and illustrate how the activities relate to one another. The activities are: data-base design, implementation planning, implementation test preparation, system test preparation, acceptance test preparation, physical system interface specification, user documentation and overall project planning. They are shown in Figure 1. (Activities that end before design or begin after design are not shown; neither are hardware activities.)

Physical data-base design. Physical data-base design is the determination of how the required access paths through data are to be implemented. For example, an access path may be implemented by chains, pointers, physical adjacency, or another mechanism. The physical paths are derived from the logical paths, which are discovered during analysis, and from physical constraints, such as volume, response time and security, which are known by the end of analysis.

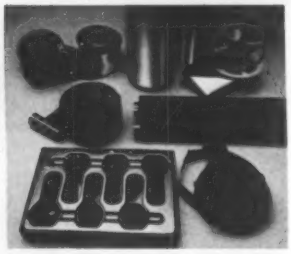
The data-base designers cannot serve the interests of any one application, however. Their job is to satisfy the data-base needs of all applications in the organization. Therefore, the people designing an application will have to take advice from the data-base overlords on how best to access the data they want. Since data-base design for an application may go on in parallel with the structured design of an application, it is crucial that both sets of designers converse regularly about the area in which they meet — the interface to the data base.

Implementation planning. You can often glean some tentative ideas about how many and which versions of the systems should be implemented at the end of analysis. However, you will have to wait until at least the top levels

There's a little ROYTYPE® for each of us



ROYTYPE data processing ribbons for better results!



Why?

Because Roytype grew up with computers. We know what makes good printer ribbons perform better because we designed them with your equipment in mind. Each Roytype computer ribbon is a unique combination of the finest material, film or fabric, the best ink formulation and the most efficient degree of inking or coating. Roytype's professional manufacturing operation, utilizing the most modern technology and equipment, ensures consistently fine quality.

Complete personal service nationally.

Roytype's national network of computer ribbon experts can supply all your ribbon needs. Choose from a complete range of data processing ribbons including our exclusive gold back Scanoptic or other multistrike and single pass film ribbons as well as our fabric ribbons in a variety of lengths and widths. For more information, fill out and mail coupon below to: ROYTYPE DEPT. 510, Royal Business Machines, Inc., 150 New Park Avenue, Hartford, CT 06106.

Put a little ROYTYPE in YOUR data processing equipment.

ROYAL

Take a new look at Royal. You'll find more than what we're famous for.

OK, ROYTYPE! Let me see the computer ribbon you have for my equipment.

My printer brand / model is _____

_____ _____

☐ *Have my Roytype representative call me for an appointment.*

☐ *Send me details.*

Name *Title*

Company

Street

City/State/Zip

Telephone

ROYAL BUSINESS MACHINES, INC.

of the structure chart emerge before you can confirm these notions. Then implementation planning has to proceed apace, because the plans and test cases for implementation will be required surprisingly soon after programming begins.

Implementation test preparation. For each version of the system that you implement, you should include specific tests for each function that version carries out. If possible, you should partition the package of test cases by function to give yourself flexibility in the order in which you implement and integrate modules.

System test preparation. There is a system test for each version of the system to be delivered. System testing is different from implementation testing in that you must do it *after* all the programming and implementation testing for the system version is completed. The test cases must cover every facet of a system in production: operations, user interface, internal functions and so on. You can compose a test case as soon as the aspect of the system being exercised by that test case is known in sufficient detail. You don't have to wait until just before system testing to create all the test cases.

Acceptance test preparation. There is an acceptance test for each version of the system to be delivered. Acceptance testing involves putting the system through its paces so that the user can see that he has not been sold a shambling old nag when he paid for a sprightly young filly.

Acceptance testing is technically similar to system testing. Politically, however, it's very different. System testing allows you to excise bugs in the system discreetly while no one is watching. But acceptance testing is carried out under a spotlight in the presence of the user, his audit representatives — wearing black suits, white ties, Fedoras and shades — and possibly even his carnivorous contract lawyer. At acceptance time there is only one thought in your mind: "I wish I'd done more and better system testing!"

Acceptance test preparation may be completely in the user's hands. But more often the preparation is shared between the analyst and the user. The criteria for acceptance should be included in the structured specification before it is signed. If they are not, you should include a definite plan for agreeing on the criteria in the specification.

In that case, you can do acceptance test preparation completely in parallel with system test preparation. Since you can probably share test cases between acceptance testing and system testing, you can make your system test a dress rehearsal for the acceptance test. The more problems you uncover during the dress rehearsal, the more likely it is that everything will go right on opening night.

Physical system interface specification. At the end of analysis, during the new physical stage, the analysts and the designers discuss with the user how information should enter and leave the system. The analysts offer the user a range of options: For $1.98, he can have the toggle-switch and magnetic-wire data-entry system, whose output will appear as a hexadecimal core dump; for $12 million, he can have the distributed multitypeface optical-character-recognition direct-data-capture system, whose output will be delivered in spoken English (with a Finnish translation simultaneously relayed by satellite to the Helsinki branch office).

Thenceforth (not necessarily by the end of analysis but well before the end of design), physical decisions have to be made about the system's interfaces. Once the user has chosen his system, formats have to be agreed on, machine-machine protocol has to be defined, human-machine conversational protocol has to be worked out . . . and so on. These physical details will affect the bottom-most levels of the structure chart.

User documentation. At the end of analysis, you can begin to write a brief description of the internal functions of the system. However, much more important to the user is the external view of the system, for he sees the system only through its interfaces.

The documentation given to a user when he buys a system is similar to the operator's manual you'd give him if he bought a car. For a computer system, the documentation should provide instruction on how to install the system,

(Continued on In Depth/24)

WHERE WOULD YOUR HARDWARE BE WITHOUT SOFTWARE?

Your hardware would be in the dumps without exceptional system software to guarantee maximum productivity.

Nixdorf Computer Software Company (NCSC) is a world leader in system software for users of IBM System/360, 370, 4300 and plug-compatible computers.

The many software products NCSC has designed to improve your installation's productivity include EDOS/VS—an operating system with increased productivity over IBM DOS/VS and DOS/VSE; PDMS—an online programming system; ECON—an enhanced console system with interactive facilities; NCSC Database and NCSC Datadictionary—an efficient data base management system; and DEX—an online data entry system.

Productivity through better software is what NCSC is all about. You owe it to yourself to keep your hardware out of the dumps and running at maximum efficiency. Contact any one of our offices to obtain more information and to schedule an installation in your operation.

NIXDORF COMPUTER SOFTWARE COMPANY

Richmond 804/276-9200, Los Angeles 714/634-0733, Chicago 312/635-6310, Dallas 214/247-2004.

NIXDORF COMPUTER



Hot off the wire.



Dow Jones News/Retrieval provides instant data for decision makers with TI's 745.

When corporate decision makers need information, Dow Jones News/Retrieval service and TI's *Silent 700** Model 745 Portable Data Terminal have the answers.

The reliable 745 supplies up-to-the-minute "hot news" from Dow Jones domestic and international newswires, articles from *Barron's* and *The Wall Street Journal,* plus current and historical stock quotes from over 6,000 companies.


Model 745

Professionals in all fields value the 745's quick access to a broad range of categories including financial, corporate, industrial and governmental developments. News stories appear within 90 seconds of "breaking" and are stored at Dow Jones for up to 90 days. Great for spotting trends and gaining perspectives.

With the portable 745's built-in acoustic coupler, users can dial up the latest news from anywhere there is a standard telephone and electrical outlet. And since the lightweight data terminal can travel from office to office or on out-of-town trips, decision makers keep in touch.

The 745's typewriter-like keyboard lets users instantly choose from an index of descriptive headlines for concise, informative stories, all printed at a virtually silent 30 characters-per-second. And its hard copy printouts assure that information is circulated accurately.

The versatile 745 is also providing high yields for businesses like banking, real estate and insurance companies.

TI is dedicated to producing quality, innovative products like the *Silent 700* Model 745 Portable Data Terminal. And TI's hundreds of thousands of data terminals shipped worldwide are backed by the technology and reliability that comes from over 30 years of experience in the electronics industry.

Supporting TI's data terminals is the technical expertise of our worldwide organization of factory-trained sales and service representatives, and TI-CARE†, our nationwide automated service dispatching and field service management information system.

That's why TI was appointed the official computer and calculator company of the 1980 Olympic Winter Games.

If you would like more information on the *Silent 700* Model 745 Portable Data Terminal, contact the TI sales office nearest you, or write Texas Instruments Incorporated, P.O. Box 1444, M/S 7784, Houston, Texas 77001, or phone (713) 937-2016.

Fifty Years of Innovation

*Trademark of Texas Instruments †Service Mark of Texas Instruments Copyright © 1980, Texas Instruments Incorporated

TEXAS INSTRUMENTS

We put computing within everyone's reach.

AUTHORIZED DISTRIBUTOR

TEXAS INSTRUMENTS DATA TERMINALS

Domestic

ARIZONA
Tempe:
MicroAge
602/967-1421

CALIFORNIA
Costa Mesa:
Data Systems Marketing
714/540-2312
Culver City:
Data Rentals/Sales, Inc.
213/559-3822
Northridge:
Dayton-Forester Associates, Inc.
213/701-0127
Oakland:
Consolidated Data Terminals
415/632-1434
San Leandro:
Computerland Corporation
415/895-9363
Santa Clara:
The Systems Store
408/988-1988

COLORADO
Denver:
Lewan and Associates
303/759-5440

FLORIDA
Pensacola:
Computer and Terminal Exchange
904/434-2685

GEORGIA
Atlanta:
Equipment Resources, Inc.
404/955-0313

HAWAII
Honolulu:
Industry Data Services
808/521-8011

IOWA
Cedar Rapids:
Deeco, Inc.
319/365-7551

KANSAS
Kansas City:
North Supply Company
913/888-9800

MARYLAND
Chevy Chase:
Federal Data Corporation
301/652-5766

MASSACHUSETTS
Burlington:
Computrend, Inc.
617/272-8372

MINNESOTA
Minneapolis:
Loonam Associates, Inc.
612/831-1616
Tele-Terminals, Inc.
612/535-5330

NEBRASKA
Lincoln:
Centel Communications Company
412/475-5941

NEW JERSEY
Allendale:
Leasametric
201/825-9000
Blackwood:
Data Access Systems, Inc.
609/228-0700
Springfield:
Westwood Associates, Inc.
201/376-4242
Union:
Transnet Corporation
201/688-7800

NEW YORK
Farmingdale:
Arrow Electronics, Inc.
516/694-6800
Great Neck:
MTI Sales Corp.
212/895-7177
Rochester:
Western New York Computing
Systems, Inc.
716/381-4120

OHIO
Cleveland:
Comtel Instruments Co.
216/442-8080
Data-Tron, Inc.
216/585-8421
Pioneer Standard Electronics
216/587-3600
Dayton:
ESCO Incorporated
513/226-1133

PENNSYLVANIA
Pittsburgh:
C G Distributors
412/366-5056

TENNESSEE
Nashville:
NLT Computer
Services Corporation
615/256-7600

TEXAS
Addison:
Data Applications Corporation
214/931-1100
Dallas:
Hall-Mark Electronics Corp.
214/234-7300
Texas Instruments
Supply Company
214/238-6882
Houston:
Tel-tex, Inc.
713/868-6000
Plano:
Responsive Terminal
Systems, Inc.
214/424-6526

UTAH
Salt Lake City:
Type-A-Line Business
Machine Co.
801/521-5310

VIRGINIA
Arlington:
Terminals Unlimited
703/525-6300

Canada

NEW BRUNSWICK
Fredericton:
Datamaster Corporation, Limited
506/454-8953

ONTARIO
Toronto:
Data Terminal Mart
416/677-0184
Hamilton Rentals
416/272-0724
Leasametric, Inc.
416/676-1897

QUEBEC
Montreal:
Cesco Electronics, Limited
514/735-5511

IN DEPTH

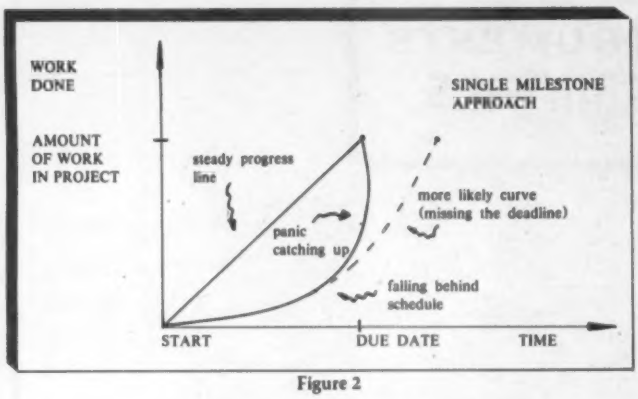


Figure 2

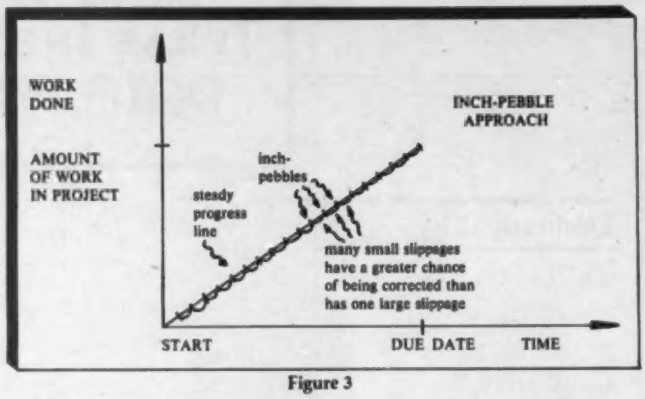


Figure 3

(Continued from In Depth/21)

how to operate it (start it, close it down, keep it running, check it periodically), how to prepare its input, how to use its output and how to care for it generally. However, much of this documentation cannot be produced until the operations documentation is written, a task that follows design.

Overall project planning. It is a poor general who goes into battle without a plan. It is a worse general who won't change his battle in the light of events. I never fail to derive cheap amusement from the offices of some managers, where beautifully typeset, chronologically scaled Pert charts look down from the walls in mocking obsolescence at their conscientious young authors. Had Robert Burns been alive today, he would perhaps have said: "The most neatly drawn Pert charts of rodents and people frequently depart from their initial layouts."

Managers and their planning tools should be flexible. During design, some parts of the structure chart are developed more quickly than expected — and other parts more slowly. User changes will arise and possibly will require a whole new subsystem to be added. One should be able to adapt one's plan to new goals, new estimates, new schedules and new budgets.

Estimating

Project estimating has two parts: the first is estimating the work to be done *(requirements estimating)*. The second is estimating the resources available *(constraints estimating)*.

A simple example of a requirements estimate is, "From the project survey, I estimate that the development of the system will require 16±3 person-years with a minimum elapsed time of 20 months." A simple example of constraints estimating is, "We have up to 12 people of suitable skills available for this project. We have 30 months to get the system up; after that, the vendor of our current Lemming system will withdraw its support."

Never allow the estimate of a constraint to influence the estimate of a requirement. In the small examples above, all is well: The requirements fit within the constraints. But what if you had only five people available for the project? Then clearly you couldn't implement the system, for there would have been only 12 1/2 person-years (five people for 30 months) available for this 16 person-year project.

It is very tempting to say, "Well, Joe said that it might be possible in 13 person-years. That's pretty close to 12 1/2 person-years, so I guess we're OK." And I guess they are not OK! Never alter an estimate to make it fit another estimate.

If the requirements for a project don't fit within its constraints, you have four options: Increase the available resources; decrease the amount of work to be done; do both of the above; or do neither and give up the whole idea.

Constraints are usually easier to estimate than are requirements. Why? First, they can be — and should be — estimated after requirements, so all that is needed is a lower bound on each constraint to see whether each requirement can be fulfilled. Second, constraints are usually more tangible than requirements. They are defined in terms of the number of programmers in your shop, the amount of money the user is willing to spend and so on.

Estimating requirements is difficult because it means finding out *before* the work has been done how much work will be done, how long it will take, how many people it will need and how much it will cost. As a species, we are blessed with 20-20 hindsight, but we are not so fortunate with regard to foresight.

Concrete Basis

Although you can never know precisely how much programming and integration effort will be required until it is actually completed, the structure chart provides a concrete basis for an estimate. It is a complete charter of everything to be implemented, conveniently split into small units that have minimal interactions with one another. Large problems are difficult to estimate because of their mind-boggling complexities. The structure chart presents a means of estimating the whole as the sum of its parts. It will never be exactly correct, but it will come tolerably close for a set of modules that are loosely coupled.

There are few factors more likely to make reality depart from an estimate than parts of a system obstinately refusing to work until the twentieth iteration of testing and debugging. Small, loosely coupled, well-walked-through modules are less likely to suffer from this complaint than are large, tightly coupled modules. Therefore, a system developed using structured design will be rather more likely to bear out that vision of Utopia that somehow always afflicts an estimator just before he makes his estimate.

Incremental top-down implementation enables management to spot slippages in a schedule earlier than if you had to wait for a momentous milestone to pass by before you can tell that anything is amiss. This inch-pebble approach not only helps you to make an estimate, but also allows you to revise an estimate early. (The inch-pebble concept is set forth in E. Yourdon and L. Constantine, *Structured Design: Fundamentals of a Discipline of Computer Program and Systems Design*, New York: Yourdon Press, 1978, p. 367.)

OS/RPG II Compiler Now Available



Have OS in your shop but want to run DOS/RPG II? Be smart. Don't go through a costly, time consuming conversion. Go with the PMS OS/RPG II Compiler.

Developed by Policy Management Systems (PMS), the PMS RPG II Compiler allows you to run DOS/RPG II in any OS environment.

Major benefits of the PMS Compiler include:

- No efficiency loss
- No change to source code
- No additional run time overhead
- Auto report feature supported
- Complete maintenance
- Easy installation

To find out how many of the nation's largest corporations feel about the OS/RPG II Compiler, call PMS Marketing (803-748-2521) and ask for George Pocisk.

That information is necessary to the manager for monitoring and planning the project, and it is also valuable for keeping faith with the user. If you can see that you're going to slip the deadline, it's only fair to give the user as much advance notice as you can. He won't thank you for the warning, but you'll be less likely to wind up in the ocean wearing cement shoes than if the user himself discovers the slippage at the 11th hour.

At this point, you might complain that the end of the design phase is a little late to be making and revising estimates. I quite agree. Structured design helps most with estimating the requirements for the activities following design. However, the DFD of structured analysis is a partitioning tool that will help in the estimation of design requirements. In fact, many shops use high-level DFDs in the project's survey to rough-estimate the work that the whole project will entail.

An inch-pebble approach is also likely to facilitate smoother progress. For instance, imagine that we have a project with only one checkpoint — the final deadline. It is likely that we can slip a long way behind schedule before we notice that anything is wrong, because the deadline is distant. Figure 2 illustrates the point.

Inch-pebble monitoring is likely to allow steady progress. Slippages can be corrected more easily without undue panic (see Figure 3).

It is a very good idea to keep a comprehensive log of every project that you manage. The log should record at least who did what, and for how long, and how that tallied with your estimates for that task. The log won't help you tremendously on the project being logged, but it will be a great source of estimating wisdom for your next project.

Personnel Allocation

In the past, there has been a notorious tendency on the part of management to let loose a horde of programmers on every medium-to-large-size project. Presumably, this was in the hope that, with more brute force than finesse, the masses would sweep all before them.

Unfortunately, the system that such a mob produces is usually a piece of encapsulated chaos that bears little relationship to the problem to be solved. This phenomenon has been immortalized as the Thousand Programmer Law, which I have rephrased as follows: If you assign 1,000 programmers to a system without a prior design, they will produce at least 1,000 modules — even if it is only a 100-module system!

With the completed structure chart available before programming begins, you have a realistic outline of the programming work to be done. Programmers can be assigned to fit the work load, rather than the other way around.

But *how* do you assign people to program from parts of a structure chart? The criteria for packaging a system for people are very similar to those for packaging a system for the machine. Give each team of programmers a subsystem that is strongly cohesive and loosely coupled to other subsystems. Minimal interfaces between subsystems will ensure minimal interfaces between teams.

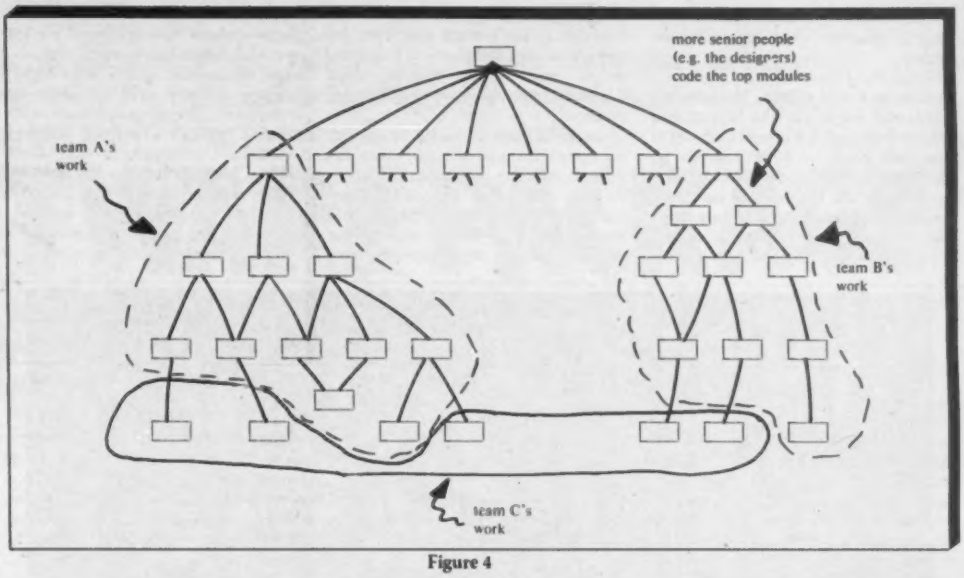
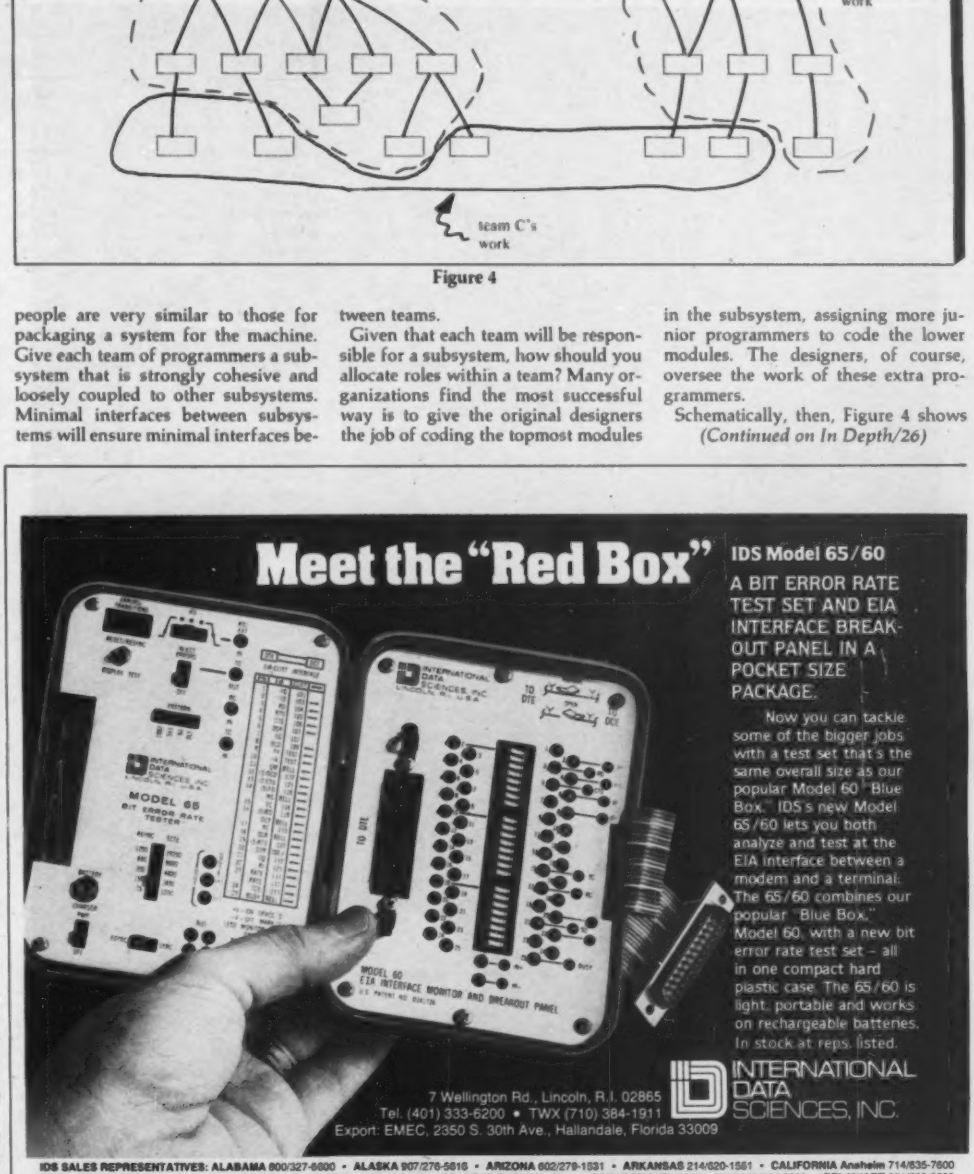


Figure 4

Given that each team will be responsible for a subsystem, how should you allocate roles within a team? Many organizations find the most successful way is to give the original designers the job of coding the topmost modules in the subsystem, assigning more junior programmers to code the lower modules. The designers, of course, oversee the work of these extra programmers.

Schematically, then, Figure 4 shows

(Continued on In Depth/26)



IN DEPTH

(Continued from In Depth/25)

how a structure chart might be assigned.

Notice that I have departed from vertical slices in one place: I have made a horizontal cut across the bottom and assigned most of the lowest modules to one team (team C). What's so special about the lowest modules? Typically, modules at the bottom will be utility modules and data-base accessing modules. It is often a good idea to allocate them to a team with special skills. But there's a more important reason: The modules at the bottom also represent the whole user interface. If too many people work on the user interface, fearsome inconsistencies might be introduced.

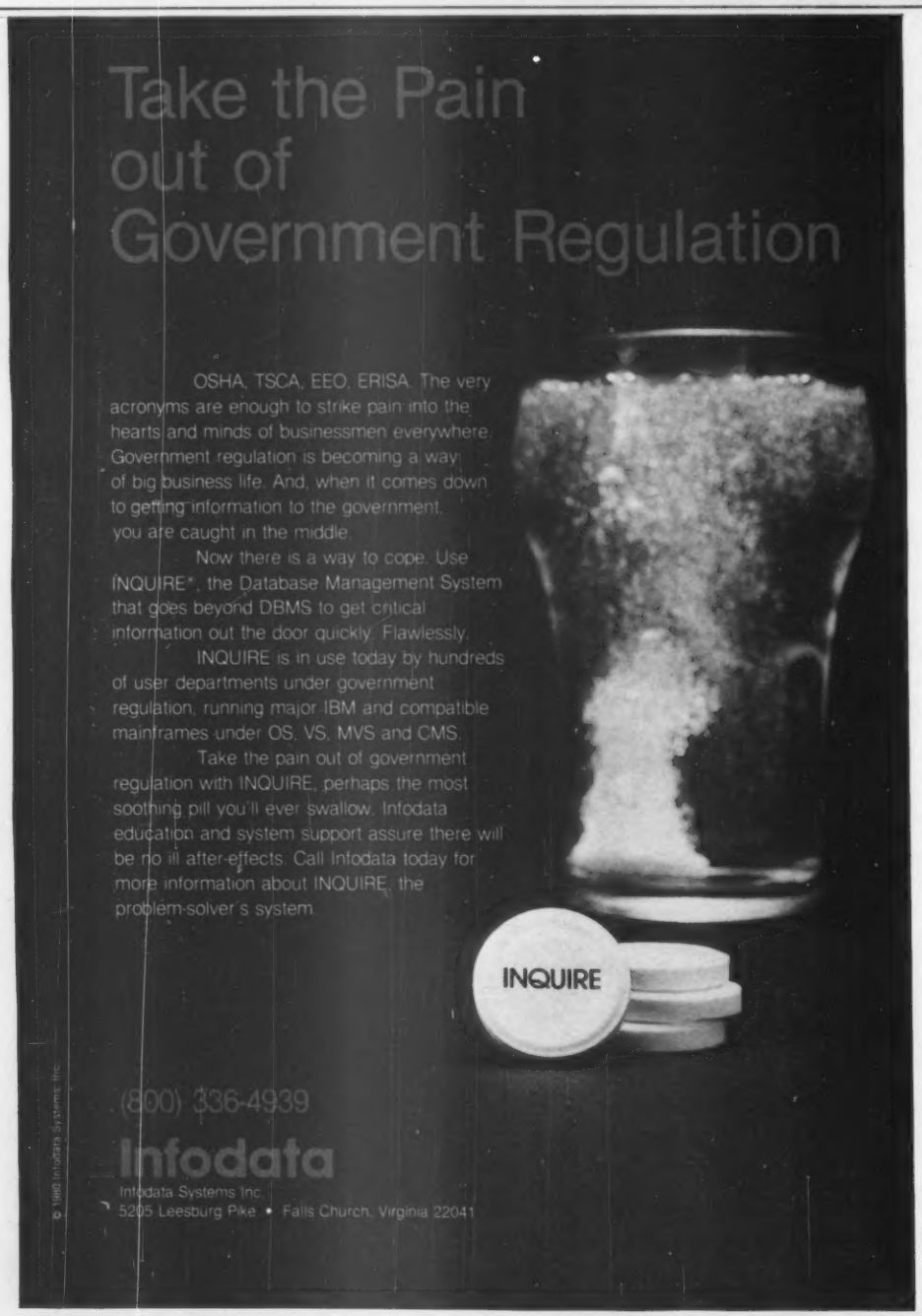
I remember fighting with an operating system that had obviously been developed partly in Bhutan and partly in Bulgaria. For some job-control commands, the system parameters had to be entered in one order; whereas for other commands, they were required in a different order, probably because the two teams that developed the system had not talked to each other. For some commands, spaces were significant; for others, only commas were recognized. That system was an example of Conway's Law (M.E. Conway, "How Do Committees Invent?" *Datamation*, April 1968 pp. 28-31): The structure of a system reflects the structure of the organization that built it.

Allowing the user to perceive a homogenous system is also an example of what Brooks calls *conceptual integrity* (F.P. Brooks, *Mythical Man-Month*, Reading, Mass.: Addison-Wesley, 1975, Page 42) and what the Germans splendidly term "benutzefreundlichkeit," which translates as "user-friendliness." Thus, the sensible assignment of people to the development of a system will benefit not only management and technicians but also, very often, the user.

A manager owes it to his subordinates to provide them with the most modern and most apt tools for their job. If he doesn't provide such tools, then he should not be surprised if his people become unhappy or tend to move on to other positions. However, a DP manager in a large metropolitan bank pointed out to me the opposite side of this argument: "How do you keep 'em down on the farm once they've learned S.D.?" The answer to this question is that not only must a manager make good tools available, he must also make the *opportunities* to use the tools available to his staff.

Philip Metzger (P.W. Metzger, *Managing a Programming Project*, Englewood Cliffs, N.J.: Prentice-Hall, 1973, pp. 103-144.) says that a good manager "carries the water" to his subordinates: Whatever the product you are building, it's your people who put it together. Your job is to provide them with the environment and the tools they need to perform . . . All a business is is its people. Take care of them.

Structured design will never replace good old hard work, either for managers or for technicians. However, it should ensure that every effort that is expended contributes to the final success of the project rather than being wasted through lack of overall direction.





Page-Jones is a New York-based senior systems consultant for the Boston firm of Softech, Inc.

Born in Wales, he began his computing career in 1973 as a programmer/-physicist at Cern, Geneva, Switzerland, before returning to Britain to work at an engineering and commercial software house and later at the University of London as a lecturer.

Page-Jones came to the U.S. in 1977 and served for three years as a staff consultant for Yourdon, Inc.

Page-Jones holds a B.A. degree in mathematical physics from Essex University, England, and an M.S. degree in computer science from London University, England.

THE SOFTWARE PACKAGE GENERATION

The generalized software package has enabled computers to become cost-effective for the companies that use them. Without packages, computers might have wreaked havoc on users.

By Martin A. Goetz

Many analogies in history can be used to discuss the effects of technology on human behavior, on workers, on employers, on businesses and on governments. Certainly, the discovery of electricity, the telephone, the steam engine, the automobile, the airplane, radio/TV and the general-purpose computer have each significantly changed the world.

Many of these monumental events, however, were not heralded as earth shaking. It is only in retrospect that we can comprehend what these technologies have accomplished over the years and can analyze what actually contributed to their success.

General-purpose computers are different from the other technological developments. I believe that, by themselves, they would *not* be viewed as a major technological advance. After all, computer hardware is essentially an incomplete hunk of metal which requires a computer program to drive it. And the *custom* program is not the ingredient which makes computers a cost-effective and practical commercial business tool.

Rather, it is the *generalized* software package that has enabled computers to become cost-effective for the masses of corporations, companies and governments that are using them. In fact, without software packages, computers might have wreaked havoc on the typical business user. Let me explain the basis for this somewhat radical viewpoint.

Computers as we know them today were developed during the mid to late 1940s and were first used commercially during the early 1950s. Now, in 1980, we have 30 years of computer experience behind us. What have we learned and observed? As a viewer of the scene since 1954, this is what I believe has happened to the industry and the computer user.

Early Computers

In the 1950s and early 1960s, the use of computers emulated the punch card applications. Most applications were restricted to the limitations of the first- and second-generation computers, which were batch processing and sequential processing machines.

Software packages were limited to those provided "free" by manufacturers: such as assemblers, basic utility programs, I/O subroutines, sort programs and report program generators. In addition to the manufacturers' packages, there were user-donated program libraries, but they were largely ineffective.

Only a few thousand companies used computers during this period, and their applications were relatively simple. Both programming cost and program reliability were concerns for these companies, but were not considered major problems. While computer usage was still not cost-effective, users believed it was just around the corner.

Third-Generation CPUs

Computers in the 1960s became more complex and faster. With increased internal and I/O capacities, more than one job was processed at a time. Operating systems became an essential requirement.

The sophisticated programming applications for third-generation computers were more than most companies could cope with. Thus, while computers were getting faster and cheaper, the programming problem was growing out of control. It became apparent for the first time that the critical element in the use of computer hardware was the programming. Ironically, this critical function was usually performed by users with only six weeks or less of formal training! Computer science college graduates were few and far between.

During the 1960s, a few more software packages were provided by hardware manufacturers and some independent software companies. For the most part, however, there still was little use of software packages. Those that were available were given away free in a noncompetitive environment.

Most companies in the 1960s considered computers more of a curse than a blessing; complexity, cost and reliability became overwhelming problems. A majority of studies in the 60s showed that computers were not cost-effective and were contributing to a great deal of customer dissatisfaction and even loss of company profits.

The 1970s saw third-generation computers evolving and becoming less expensive. However, with the advent of unbundling in 1970, more than 2,000 software products quickly appeared on the market, and most users began to *purchase* their basic as well as optional software products. It was also during the 1970s that computers became cost-effective for many companies.

More than 1,000 software packages are being offered today by computer manufacturers and more than 2,000 packages are being marketed by independent software product companies. If we look at the origin of the instructions executed in a computer, we would probably see 50% to 75% of CPU cycles spent executing instructions from standard software products. This is significant because it means software products are an integral and essential part of most users' operations.

Let's look at today's typical medium to large-scale computer user. He is dependent on the operating system and its many components; on a large number of programming tools; on teleprocessing monitors, data base systems and sorts; on application packages; and on his own custom programs which operate independently in the computer or along with software packages. Anyone scrutinizing his computer operation will see the heavy dependence today on software packages.

The moral of the story is that, without software packages, today's user might still be floundering like he was in the 1960s. And while today's typical DP user still has a multitude of problems, the problems would be significantly greater without software packages.

Competitive Environment

The software products business — which includes independent software companies, hardware manufacturers and industrial organizations (such as banks and insurance companies) — is today approaching $2 billion in annual revenues. Software product growth is estimated to be 27% per year for the next five years.

Users can choose from a wide variety of competitive software packages. The Datamation/Datapro Research Corp. survey reflects a sampling of user rat-

(Continued on In Depth/30)

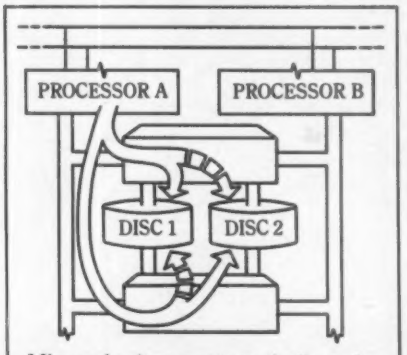
The World's First NonStop™ DBMS

Tandem NonStop™ ENCOMPASS

ENCOMPASS is the only DBMS with the benefit of running on a NonStop system. It's also the only high performance, relational data base management system designed from scratch to provide unmatched data integrity in high volume on-line transaction processing environments.

We made relational fast.

A true data base operating system is the foundation with much of the retrieval techniques designed right in. And the structure of data on disc is optimized to minimize head movement. Memory cache retains most frequently used items in a buffer. In fact, any information in a file that filled a 300M byte disc drive could still be retrieved with an average of one seek. Combined with Tandem's optional mirrored volumes, it all adds up to tremendous speed and throughput with all the benefits of relational structuring.



Mirrored volumes automatically maintain identical copies; write operations occur simultaneously, read operations performed using drive with head closest to data.

Networking made easy.

Each individual system can be expanded to sixteen processors, with additions of memory, terminals, discs, and there will be no loss whatsoever on the original investment—hardware or software.

The relational nature of ENCOMPASS, along with our networking software, EXPAND, allows a single data base to be distributed over multiple systems. Easily and safely. Up to 255 systems, each with as many as sixteen processors and thousands of terminals, each with unobstructed access to the data base distributed throughout the network.

Automatic Terminal Management.

Terminal management has been the classic nightmare of on-line data base systems. No more. ENCOMPASS automatically handles support for the Tandem 6520 Multi Page Display, Tandem 6510, and IBM 3270. The Tandem system also supports a variety of communication methods and protocols, including Asynchronous, Bisynchronous, Multipoint, Point to Point, X25 and SDLC.

Screen formatting, data validation, screen sequencing and data mapping, plus sequencing and control of multiple terminals; these are all handled for the application programmer automatically and at a fraction of the cost in development time and dollars.

Backout and recovery over a distributed data base.

Consistency of the data base is essential. Multiple files must be capable of being updated simultaneously, even if located across distributed nodes. If for any reason a transaction cannot be 100% completed, this is the one system in the world which can un-do it completely. Automatically.

The system will recover each piece of the transaction from everywhere in the distributed data base. Without cost-killing overhead. A major breakthrough in a network, DBMS. No one else even comes close.

NonStop™ availability in Hardware and Software.

Because of its unique architecture, the system will keep on running without interruption, without loss or duplication of a transaction-in-process even if a failure occurs in any processor, I/O channel, disc or disc controller.

Tandem NonStop™ architecture provides not only this redundancy in hardware, but the software to take advantage of it, utilizing all available resources.

The NonStop™ system ensures that every update is completed to the data base. And with ENCOMPASS DBMS, NonStop™ operation is automatically built into all of your programs.

On-line's as easy to program as batch.

One key theme behind the performance and reliability of our NonStop™ DBMS, ENCOMPASS, is the ease of use for programmers, systems designers and users.

It's easy to extend the data base, to expand the system to a network, to manipulate the data. And it's easy to add new resources, new hardware, new software, new files. It's easy to provide controls and security. Easy to work with. Easy to repair. And above all, easy to learn.

You don't need to learn a whole new language with the ENCOMPASS system: OPEN, READ, WRITE are the verbs you've been using all along. Industry standard COBOL, FORTRAN, MUMPS and our own transaction-oriented language TAL provide simple interaction between programs and data base.

The All-ENCOMPASSing DBMS.

And there's still more. In addition to all this, there's a whole host of other features that the ENCOMPASS data base management system will provide. To name just a few:

- on-line data base backup
- transparent access to distributed data base
- efficient query-report generation
- dynamic and automatic adjustment to varying transaction loads

All that remains for the user is:

- simple batch type application modules.

What could be simpler?

Tandem, NonStop, ENCOMPASS, and EXPAND are trademarks of Tandem Computers Incorporated.



For complete information.

Call or write for our ENCOMPASS DBMS brochure, to arrange a demonstration of our unique capabilities or addresses of local sales/service offices, domestic and international.

TANDEM
NonStop™ Systems

TANDEM COMPUTERS INCORPORATED,
Worldwide Headquarters 19333 Vallco Parkway,
Cupertino, CA 95014 USA

Toll Free 800-538-3107 or (408) 725-6000 in California

Offices throughout the U.S.A., Canada, Europe, United Kingdom and Japan. Distributors in Australia, Finland, Greece, Mexico and South America.

IN DEPTH

(Continued from In Depth/27)

ings of many software packages. By and large, the survey shows overall satisfaction with the rated packages.

There is no substitute for a competitive environment. As in any business, the customer is king: He must be satisfied or he will go elsewhere. Competition has served to improve the quality of software products, the features of the products and the price.

Software packages today provide the best return on a dollar-per-dollar investment. With the cost of custom programming increasing dramatically and with the shortage of qualified programmers, the software package is an unbelievable bargain. Not only can a user buy a package that has been fully tested and is operational in hundreds of sites, but he can also receive full maintenance against errors.

Additionally, the user receives improvements over the years and can begin using the package in a matter of days. In general, users do not have the expertise to even build such packages, let alone afford the enormous expense.

More important, however, a package takes years to build, great expense to debug and document and even more time and money to maintain.

Another important consideration is human engineering. This intangible element is critical to effective user interaction with a program and ultimately reflects the ease of use and features of a package. It is extremely difficult for the large majority of users to develop a custom program which adequately fulfills important human engineering needs.

Additional Benefits

Packages have also brought many psychological as well as productivity benefits to the typical software product user. Studies have shown that programmers are more productive and morale is higher when state-of-the-art packages are introduced into a company.

Finally, many software products increase the effective throughput of the computer and increase the reliability of operational user programs.

Software product companies have provided other, less obvious benefits to the user as well. For example, today's packages have undergone testing for years and the code, although perhaps not bug-free, represents the most stable type of software available.

Additionally, since packages are built in a competitive environment, they tend to be more efficient than custom programs. They also reflect a great deal of actual experience by the time they are installed by the average user.

All in all, there really is no substitute for a software package if it meets the needs of a user.

Caveat Emptor

Craftsmanship, workmanship, quality, service, efficiency, reputation, guarantees and warranties are all areas explored in choosing and evaluating products — both in and out of the computer field. A prudent buyer, however, is a cautious buyer.

There have been many articles on how to evaluate software products. Such articles should be read carefully, for products vary considerably in capability, price and usability. The key is to compare.

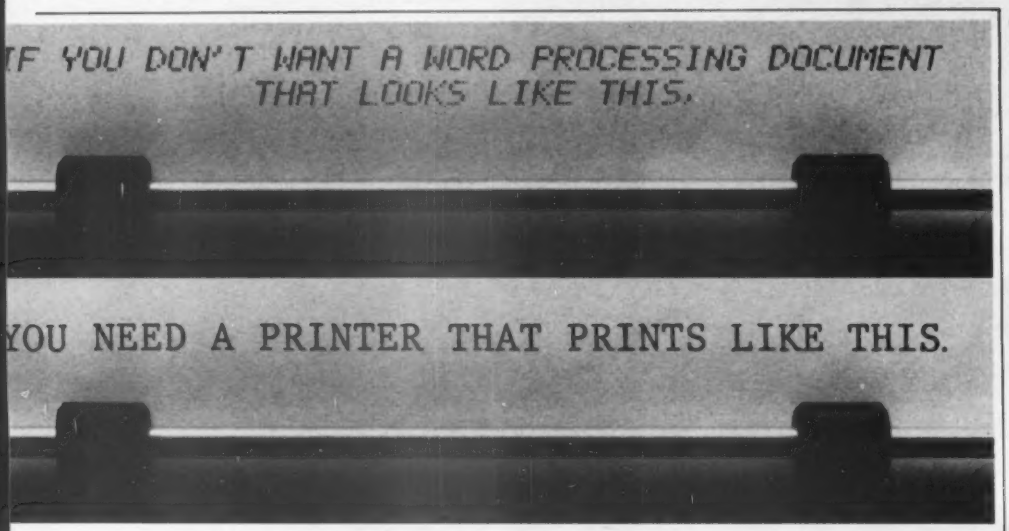
Buyers who don't compare are doing their company a disservice. In today's competitive environment, buyers who "sole-source" the purchase of software or simply buy from their hardware manufacturers without looking at alternate sources will, in the long run, *not* benefit from the competitive nature of today's software products industry.

Ingredients for Success

At last count, software packages numbered in the thousands. There is no doubt that the catalyst for this rapid growth was the unbundling of software back in 1970. Prior to that time, there was only a very small handful of successful software products; today there are hundreds.

While unbundling did increase the opportunity for software product success, there are still literally thousands of unsuccessful — or marginally profitable — software packages which have been built by both hardware manufacturers and independent software suppliers. On the average, the actual chance for success is only about one in 10.

Because of this, questions continue to linger in many people's minds: What



The more your system can do, the better your terminal should be. That's why, if you're adding text editing capability to your data processing system, you should also think about adding a quality daisywheel terminal to replace the matrix terminal you're using now. And the best-quality terminal you can buy is one by Qume.

A printer for every application.

No matter what application you choose, Qume makes a printer to fit it.

Like our Sprint 5® KSR and RO, which have achieved the reputation for being the easy-to-use leader in letter-perfect terminals. You can have 50 different typestyles to use with it, including APL, scientific symbols and international character sets.

And there's the Sprint 5 Wide-Track™ with RS-232C interface. The first character printer data terminal in the world capable of handling paper up to 28 inches wide. That's a full 264-column printing area. Sprint 5 Wide-Track adds an entirely new dimension to the printed word.

The best backup in the business.

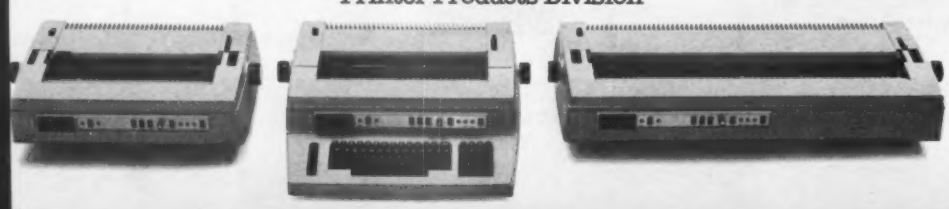
Not only do we make the best printers, but we also provide the best support to back up what we sell. That means excellent service to the OEM and the end user, and one of the best supplies programs in the business.

So if you're getting ready to upgrade your system, then it's time you upgraded your printer as well. To a Qume.

For more information, write or call us at Qume, 2350 Qume Drive, San Jose, California 95131. Telephone: (408) 942-4000. TWX: 910-338-0232.

Qume®

Printer Products Division



THE PACKAGE GENERATION

IN DEPTH

makes a successful software product? How do you go about selecting the right type of product to build? Which will be successes and which will be losers? Which will have long lives? Which will quickly become obsolete?

Then: How do you go about developing and marketing a software product? To what degree does luck play a part in a product's initial success? And how can you ensure its continued success in the future?

The answers depend on the size of the software company, its history, its user base and its key management people. In addition, the decision on which new product(s) to develop could vary from a systematic marketing survey by an outside group or organization to a "gut instinct" by the software entrepreneur. In most cases, the decision is made somewhere between the two extremes.

Regardless of the type of package, however, many of the following ingredients are definitely necessary to produce a successful product:

Technical Factors. There are six important technical factors that are the key to success:

(1) Advanced Technology. Build that better mousetrap. Today's users are knowledgeable enough to objectively compare competitive products. Currently, successful products are usually the most technically advanced. The day of buying "pig-in-a-poke" software is gone forever.

(2) Ongoing Enhancement Program. Both users' requirements and operating environments are forever changing in today's rapidly evolving technology. Products that are continuously enhanced not only provide a viable product to the user for many years, but also help the software products company stay ahead of its competition.

(3) Expertise. Most successful software products have been built by companies with key personnel who have strong and concentrated experience in the specific areas addressed by each product. Acquiring a company with a proven product, user base and experienced personnel can provide the needed expertise. But hiring personnel with the expertise usually won't work by itself.

(4) Engineering Disciplines. Most products are targeted for long lives and must be continually enhanced to remain competitive and viable. A soundly designed and constructed product will go a long way toward ensuring success. Build your product to last, to be continuously modified and to be systematically tested in a variety of environments.

(5) Programmer Dedication. Very profitable products usually owe their success to a programming team that did more than simply implement the specifications. More often than not, there was a team effort reflecting total involvement with the product and resulting in continued product concern on a permanent and personal basis.

(6) Ease of Use. Programming management places much emphasis on a product's ease of use because of training problems, personnel shortages and inexperienced users. Thus, ease of use should be one of the primary technical goals for any product.

Marketing Factors. There are seven marketing factors that contribute to a successful product:

(1) Marketing Power. A strong, seasoned sales force is a must in today's selling environment. Without it, even the most promising product is almost doomed to failure. Of course, some products lend themselves to direct mail advertising, but this is the exception rather than the rule.

(2) Service. The really successful products have a history of being well-supported after they are sold. Users want and expect good service — and they are prepared to pay for it.

(3) Popular Pricing. A formula for determining an optimum price to maximize profits is difficult to find. In general, the most successful products are priced less than $50,000 and generally between $5,000 and $30,000. Most successful products have a cost savings ratio of at least 50 to 1 between building and buying.

(4) Meeting the Need. There are many basic problems that software products can solve. The more obvious the need, the better the chance for success. Today's successful products all meet very basic needs.

(5) Know your Competition. There is no doubt that your competitors are closely tracking you — but are you tracking them? You will not only be more successful if you know your competition, but they will stimulate and provide ideas for your enhancement program. One-upmanship is both legal and healthy, for the end result benefits both the user and the software company.

(6) Highly Demonstrable Benefits. If you can easily demonstrate the benefits of a product's use, this will contribute significantly to its positive reception. If you can't, you might consider developing a procedure for stimulating the product's practical applications. Nothing can be more effective than a live and concrete demonstration.

(7) Documentation. The successful product usually rates very highly relative to the quantity and quality of its supporting documentation. Documentation spans the spectrum from marketing literature to detailed user and installation/operation manuals.

Other Important Factors. The list of important factors for success can be never-ending, but there are five I believe are especially important to success:

(1) Resources. A good deal of money, personnel and computer power is always needed. Most products will require several years before becoming profitable (usually a two or three year wait from the start of development).

(Continued on In Depth/32)

GOOD CRT'S COME IN SMALL PACKAGES



Who says a CRT terminal has to be big and bulky to do a good job? At Ann Arbor Terminals, we offer a full 15-inch screen *and* detached keyboard as standard on all our desktop terminals. And the case is only 14" wide by 15" high by 13.6" deep. We're known throughout the industry for our high quality and reliability. On top of this, we probably have the widest range of available options in the field. Display formats from 256 to 4800 characters. Foreign language character sets. Special command sets. Custom keyboards. Editing, protected fields and block transmit.

And if your application doesn't lend itself to a desktop terminal, we offer display controllers (especially good in industrial environments) for use with free-standing monitors. Or buy our terminal without the case and mount it in your own console.

So when the CRT is the focal point of your system, why settle for a large case and small screen? You can have excellent readability without taking up a lot of room. And get the features you need. Call us for more information at Ann Arbor Terminals, Inc., 6175 Jackson Road, Ann Arbor, Michigan 48103.
Tel: (313)663-8000. TWX: 810-223-6033.

ANN ARBOR TERMINALS

HP 3000
HARDWARE AND SOFTWARE

- SUCCESS-PROVEN PACKAGES installed and supported by their developers, Hewlett-Packard and Data Systems for Industry
- FIXED PRICE AND SCHEDULE with hardware-software discounts and leasing available to qualified customers
- INTERNATIONAL SUPPORT FROM OFFICES IN —

Los Angeles · New Jersey · Dallas · Europe

ACCOUNTING
- Payroll, Personnel
- Labor Distribution
- Accounts Receivable
- Accounts Payable
- Fixed Assets
- General Ledger

MANUFACTURING
- Order Entry
- Bill of Material Processing*
- Inventory & Order Status*
- Master Scheduling & MRP*
- Shop Floor & Capacity Control
- Job Costing

*(MM/3000)

DISTRIBUTION
- Order Entry
- Multi-Inventory
- Shipping
- Billing
- Replenishment Planning
- Distributed Processing

DISCOUNTS AND LEASING
- Up to 24% volume discounts on hardware-software systems sales
- Leasing available for hardware-software system sales

DATA SYSTEMS FOR INDUSTRY
3450 E. Spring Street, Long Beach, CA 90806
(213) 595-8741

IN DEPTH

(Continued from In Depth/31)

Be prepared for cold winters — it's a cold world out there. Between the powerful hardware manufacturers and the hungry software company, you will probably face lots of competition.

If you start out on a shoestring, you may end up with little else.

(2) Management Conviction. Intuitive insight and complete commitment on the part of management are usually necessary to direct the overall development and marketing of the product. This backing will provide the vital support needed to survive those inevitable rough periods. If you don't have your management fully behind you, your chances for success will be nil.

(3) User Participation. Most successful programs cannot be built in a vacuum. Using selected users as a sounding board for new developments will help ensure the continued success of any product. User groups can also provide valuable input. In addition, feedback from salespeople based on their experience can be of great assistance in the enhancement of packages.

(4) Competition. Provided that you have a good product developed from a sound concept, always encourage and enjoy any competition which may develop. Rather than resenting or resisting this competitive environment, remember that it stimulates the market and makes users receptive to buying. Most of today's successful products are actively competing with either unbundled or bundled software.

(5) Luck. Finally, the successful software product always acknowledges luck as a factor in its success. For the most part, however, dedication, patience and foresight make a greater contribution than luck.

While the factors associated with the success of a software product may appear somewhat axiomatic, never underestimate the effort needed to assure this success. Combining and balancing the various ingredients discussed above is no simple job. In many respects, these ingredients are part of a chain — and even the smallest weak link can make the difference between success and failure.

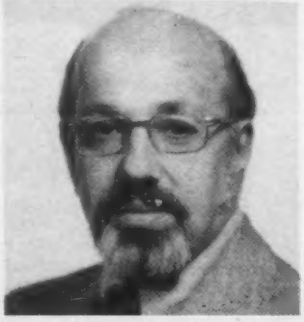
The Future

As stated earlier, the last several years have dramatically demonstrated the benefits of successful software products — in both the systems and applications areas. Successful system software has significantly improved the productivity and disciplines of program development, while simultaneously reducing the cost to get applications operational. Applications software has reduced the total number of applications which companies must develop from scratch.

The cost benefits are obvious. But besides saving money, software products can be installed without the proverbial operational headaches and frustrations. Software products are guaranteed to work — and the successful ones really do!

In the future, these benefits will continue to accrue to the users of software packages. Off-the-shelf software will become as commonplace as off-the-shelf hardware . . . except that for every purchase of off-the-shelf hardware, hundreds of off-the-shelf software products may be purchased.

The future for good software products is rosy, for they can deliver dramatic benefits to their users. However, the DP community will be able to enjoy these products and their benefits in the years ahead only if they collectively nurture and appreciate a truly competitive environment. The net result will be not only success for individual software products, but a successful future for computer users.



Martin A. Goetz is senior vice-president of Applied Data Research, Inc., Princeton, N.J.

COMMUNICATION NETWORKS
Conference & Exposition
1981
January 13-15, 1981
Albert Thomas Convention Center
Houston, Texas

3rd Annual ComNet Draws Top Professionals. . .

Just three years old, but the show and conference have already won an international audience that's concerned with TOTAL communications. . . the unified voice and data NETWORK that digital technology will put in place. The top corporate telecommunications executives are drawn to COMMUNICATION NETWORKS because they know the program will address ALL of their technical and managerial needs.



Over 70 Conference Sessions and an Exhibit Hall packed with the industry's elite manufacturers



Leaders in telecommunications management, technology and applications make up the COMMUNICATION NETWORKS speaker list. You'll meet them at more than seventy planned sessions.

Over five dozen leading U.S. and international experts in network technology and management are chairing and putting together informative sessions offering the practicing telecommunicaitons professional the best program in the industry.

Here's the Tip of the ComNet Iceberg

NETWORK ARCHITECTURE
NETWORK POLICY AND MANAGEMENT FOR U.S. AND INTERNATIONAL USERS AND CARRIERS
NETWORK OPTIMIZATION AND OPERATIONS
NETWORK SOFTWARE
NETWORK HARDWARE
NEW DEVELOPMENTS
SATELLITE DEVELOPMENTS
INFORMATION APPLIANCES
NETWORK APPLICATIONS
NETWORK ECONOMICS
OFFICE OF TOMORROW
SECURITY, EXCRYPTION AND PRIVACY PROBLEMS
AND MORE!

Register Now

Call (800) 225-4260 for latest program information

MAIL TO: COMNET '81, 575 Cochituate Rd., Framingham, MA 01701

I'm interested in information on:
☐ Conference Registration ☐ Exhibit Space

Name _____
Title _____
Company _____
Address _____
City/State/Zip _____
Telephone _____



Datalyzer System Measurement

Net Management System Among Paradyne Offerings

By Jeffry Beeler
CW West Coast Bureau

SAN DIEGO — Six additional hardware and software offerings — including four modems, a network management system and an optimal planning program — have joined the data communications side of Paradyne Corp's product line.

The offerings, all of which were introduced at the 18th annual Telecommunications Association Conference here recently, included:

- Datalyzer, an optional network management aid that allows system managers at a central site to monitor data traffic and evaluate communications performance as though they were users in a remote location.
- The Microprocessor 14400 modem, which operates at 14,400 bit/sec over standard phone lines.
- The Microprocessor 9600 rapid-poll modem, which both sends and receives at 9,600

(Continued on Page 70)

Xerox Printer/Copier For Ethernet Users Has Link to IBM Gear

By Connie Winkler
CW Staff

NEW YORK — The Xerox Corp. 5700, an electronic printer/copier that can be used as a remote computer printer to communicate with IBM systems, was recently announced here. The electronic printing system offers an electronic mail and typesetting alternative and will also compete with facsimile products, according to Robert V. Adams, president of Xerox Printing Systems Division.

The 5700 is the second product to be announced by Xerox for use with the Ethernet local data communications network. The first is the Xerox 860 information processing system announced last December.

The 5700 system features a touch-control screen that sits atop the microprocessor-based controller. The display screen shows sets of labeled boxes that the operator touches to direct the machine through preprogrammed procedures.

The 5700 has an RS-232C interface that allows it to communicate with another 5700 or with an IBM 2770 communications controller for remote printing, job entry and word processing. The 2770 allows communication with IBM 360 and 370 mainframes.

The Xerox 5700 can also communicate with the IBM 6670, a similar communicating laser printer/copier announced by IBM last year.

As Word Processor

For word processing applications, the 5700 accepts either tape cassettes from the Xerox 800 electronic typing system or magnetic cards from the Xerox 800, IBM magnetic card typewriter or IBM Office System/6. It also takes floppy disks from the Xerox 850 display typing system, Xerox 860 information processing system or the IBM OS/6.

The 5700 is basically a Xerox 5600 copier in which the line lens has been modified with a laser. The laser writes on the printing drum so that within one square inch there are 90,000 controlled dots, Adams said. A Xerox-developed 16-bit microprocessor controls the laser.

Xerox has 200 font choices for the 5700, but only 16 can run on one 5700; only four fonts can be on one page. The controller allows numerous options for how the page will be printed, including type or artwork, type size, margins and single- or double-sided printing.

The 5700 produces 43 page/-min, approximately 2,800 line/-min. (Xerox's giant 9700 computer printer produces about 18,000 line/min.) Xerox will also digitize company logos for use on the 5700.

Electronic Mail Use

For electronic mail applications, a network of 5700s can be set up and programmed to send documents automatically to locations selected by the operator.

Using 9,600 bit/sec communications facilities, a page can be sent in about three seconds with actual dialing and transmission handled automatically. At the receiving end, no operator is needed and about 1,000 pages can be stored in the system for later retrieval.

As a regular copier, the 5700 has a recirculating document

(Continued on Page 73)

Monitoring, Restoral Features

Diagnostic Modems Run With 3600

ANDOVER, Mass. — Two diagnostic loop modems operable in IBM's 3600 Finance Communications System have been announced by Intertel, Inc.

The DLM1200 and DLM2400 modems are said to address critical downtime problems by offering network monitoring and restoral features.

The modems work in conjunction with Intertel's EMS-One Network Control System and provide the link between IBM 3600 controllers and "any number of" remote terminal loops, according to the firm.

Operating at data transmission rates of 1,200- and 2,400 bit/sec, the DLM modems are said to provide "full-range network control" from a single central site without interruption to customer service at main banking offices, branch offices, drive-ins, walk-ups and automated teller machines.



Intertel's DLM1200 and DLM2400 run in conjunction with the EMS-One.

Automatic Monitoring

During on-line hours, each DLM in the loop is said to continuously monitor up to 13 critical network parameters. A change in status of any of these parameters causes an alarm to be generated on the central site EMS-One console.

In addition to automatic monitoring, EMS-One's Automatic Preventive Maintenance routinely runs DLM and line tests during off hours. These tests reportedly can often identify network problems before they affect data flow.

A third EMS-One feature, manual mode, allows manual

(Continued on Page 73)

Teletype 43 Fits Multipoint Systems

SKOKIE, Ill. — Teletype Corp. has unveiled a Model 43 teleprinter for multipoint private-line systems.

The microprocessor-driven terminal is compatible with a variety of Ansi 3.28 protocols and features flexible station arrangements for varying traffic and printing requirements and error controls.

The product also includes 16K-byte buffer for editing, sending and receiving; independent local and line operation; priority storage capability; full formatting controls; and convenient remote options load routine to simplify and speed station programming, the vendor claimed.

Other features include:

- Eighty keyboard selectable options for tailoring the terminal to the customer's system.
- Auxiliary port to accommodate an optional Teletype character or line printer.
- Longitudinal redundancy error checking.

The price of the printer is $2,662, the vendor said from 5555 Touhy Ave., Skokie, Ill. 60077.

PILLER
POWER SYSTEMS FOR COMPUTERS



KW CONTROL SYSTEMS, INC.
South Plank Road, Middletown, New York 10940
Phone (914) 355-6741 TELEX No. 13-7428

MTI gives you the pick of video terminals.



*DEC and IT are trademarks of Digital Equipment and Lear Siegler, respectively.

We stock DEC, Lear Siegler and Hazeltine, the best names in the business.

Whether your data processing needs are simple or sophisticated, MTI has the video terminal that's just right for you. And we have the applications specialists to help you choose it.

MTI is a stocking distributor of the most wanted terminals in the business. All of them. That means you get your pick of the best.

MTI is the one source for all the terminals, peripherals, applications expertise and service you'll ever need. And you'll find that our purchase and lease prices are hard to beat. Call MTI today at: 516/482-3500, 212/895-7177, outside N.Y.S.: 800/645-8016, and in Ohio: 216/464-6688.



Applications Specialists & Distributors, Great Neck, N.Y. and Cleveland.
DEC, Hazeltine, Lear Siegler, Qantel products, Texas Instruments, Teletype, Diablo, Techtran, MFE, Omnitec, Anderson Jacobson, General DataComm, Inset, Cipher, Prism, SMS, Western Peripherals, Able Computer, Elgar and Franklin Electric.

Multiplexer for HP 1000s Takes up to Eight Terminals

PALO ALTO, Calif. — A microprocessor-controlled eight-channel asynchronous multiplexer subsystem has been introduced by Hewlett-Packard Co. for its HP 1000 series minicomputer.

The 12792A multiplexer subsystem handles as many as eight terminal or electrically compatible microprocessor-based devices. An optional multiplexer panel can be located up to 300 ft away from the host computer breaking the typical 50-ft barrier for standard RS-232C specifications, a spokesman said.

The multiplexer subsystem operates in the HP 1000 M-Series, E-Series and F-Series processors. Program development and program execution are supported on the RTE-IVB operating system. Application program execution is supported on the RTE-MIII memory-based operating system.

Each of the unit's eight full-duplex channels are separately buffered and all communications from the interace memory to the host computer backplane are under direct memory access control, the spokesman noted.

The subsystem costs $2,000 including software. The multiplexer panel is priced at $600.

HP is located at 1507 Page Mill Road, Palo Alto, Calif. 94304.

Paradyne Adds Six Products

(Continued from Page 69)

bit/sec.

- An optional vertical and horizontal coordinates software package that automatically computes the least cost configuration for each of a network's multipoint communications lines.
- The LSI-2400LP, a 2,400 bit/sec modem that enables personnel at a central site to isolate and correct bugs anywhere in an IBM 3600 financial control loop network without requiring help from remote terminal operators.
- The Microprocessor 208B modem, a Bell 208B-compatible product that operates at 4,800 bit/sec in two-wire switched telephone networks.

Except for the 208B-compatible modem, all the products announced at the conference operate with Paradyne's Analysis 4420 network management system, a company spokesman said.

Datalyzer Option

Among the most important of Paradyne's six latest offerings is the Datalyzer option, which performs monitoring, diagnostic and test functions not previously supported by the Analysis 4420 system, Datalizer permits host mainframes to monitor terminal response times, CPU wait times, address failures, error rates and transaction/hour.

The option then automatically flashes an alarm message if any of the observed data-traffic variables exceed preset, user-defined limits, the spokesman said. Like the Analysis 4420 system, Datalyzer displays multiple alarm conditions simultaneously.

Combined with the performance measurement functions already offered by Analysis, Datalyzer's monitoring features reportedly allow operators at a central computing site to pinpoint system faults.

Datalyzer consists basically of a minicomputer, 10M-byte disk unit and CRT terminal.

MP-14400 Modem

Another product that ranks high in importance among Paradyne's six latest offerings is the Microprocessor (MP)-14400 modem, which its manufacturer described as the only commercial modem able to operate at 14,000 bit/sec over standard phone lines. Competing products can operate no faster than 9,600 bit/sec over the same kind of lines, the spokesman said.

One advantage of the Paradyne unit's 50% boost in throughput is said to be decreased communications costs. In the past, users needing to exceed the 9,600 bit/sec performance ceiling were forced to lease multiple transmission lines and use multiple pairs of modems.

Now, because of the Microprocessor 14400's increase operating speed, users can replace those multiple-line and multiple-pair configurations with a single line connected to just one pair of modems. The resulting reduction in communications links means that a single-line transcontinental network equipped with 14,400 bit/sec modems costs 35% less than its dual-line counterpart operating at 4,800- or 9,600 bit/sec and 76% less than a six-line configuration operating at 2,400 bit/-sec, the source said.

MP-9600RP Modem

The MP-9600RP modem, meanwhile, reportedly holds the distinction of being the only product of its sort to operate at 9,600 bit/sec both forward and backward. Other modems, by contrast, typically transmit at 9,600 bit/sec, but receive at significantly slower speeds, usually 4,800 bit/sec.

The combination of 9,600 bit/sec symmetrical operation and a 20-msec train speed enables the MP-9600RP to resist significant degradation in terminal response times even during peak periods of multipoint network activity, the spokesman explained.

Elsewhere in its product announcement, Paradyne credited the vertical and horizontal coordinates program with lowering the monthly cost of using multipoint networks. The option achieves this end by automatically finding all possible communications paths between two specified points, calculating the leased-line tariff for each path, comparing the resulting figures and indicating the least cost route.

For a 32-line conformation, Datalyzer costs $110,000 compared to $14,400 for the MP-14400, 6,800 for the MP-9600 RP, $2,500 for the vertical and horizontal coordinates software package, $1,400 for the 2,400 bit/sec modem and $3,400 for the MP-4800/208B Bell-compatible modem.

Shipments of all six products take 90 days, except for the 14,400 bit/sec modem, which won't become available until the second quarter of next year. Paradyne can be reached at 8550 Ulmerton Road, Largo, Fla. 33541.

120 CPS FLEXIBILITY AT YOUR FINGERTIPS

Whatever your application requirements, Carterfone's 5130 data terminal offers all the flexibility you need. Designed to meet a full range of user requirements, the cost-efficient 120 cps printer can be operator-programmed to new applications simply and easily.

In addition to outstanding applications flexibility, the 5130 provides smart bi-directional printing at 180 cps, 14 baud rates and a built-in 1k buffer to keep pace with incoming data. Attributes such as variable horizontal and vertical pitch, tabbing, forms control, answerback and 45 other keyboard selectable features are standard in every 5130.

For the best price/performance value in a data terminal, consider the flexible 5130, available from Carterfone through equally flexible lease, purchase or rental plans. For complete information, call or write Carterfone today.

Carterfone
Member of the Cable and Wireless Telecommunications Group
1111 W. Mockingbird Lane, Suite 1400
Dallas, Texas 75247 (214) 630-9700



SALES & SERVICE OFFICES
Atlanta; Boston; Burlingame CA; Charlotte; Chicago; Cincinnati; Cleveland; Columbus; Dallas; Davenport IA; Denver; Detroit; Fairfield NJ; Garden Grove CA; Hartford; Honolulu; Houston; Jamaica NY; Kansas City; Los Angeles; Memphis; Miami; Milwaukee; Minneapolis; New Orleans; New York; Norfolk; Oklahoma City; Omaha; Orlando; Philadelphia; Phoenix; Pittsburgh; Portland; Raleigh; Sacramento; Saginaw; San Antonio; San Diego; San Francisco; Santa Clara; Seattle; South Bend; St. Louis; Syracuse; Washington DC.

The Zenith Smart Terminal.

Compare the features.

Reverse video by character can be used to emphasize words, lines, phrases or paragraphs.

High Resolution CRT reduces eye strain and operator fatigue.

Z80 Microprocessor-control brings easy editing, cursor flexibility and reverse video highlighting to your on-line system.

Professional touch keyboard follows standard typewriter layout with 72 keys, including 12 special function keys, (8 user programmable) plus 12 key numeric pad.

Underline or reverse video blinking cursor is addressable to allow you to edit or correct on the entire screen.

Insert and delete character features allow easy correction or modification of displayed information.

80 character by 24 line format, plus a 25th line for operator messages and prompts.

Cursor and special functions are accessible by keyboard or outside computer.

Displays complete ASCII character set including upper case, lower case with descenders and special graphic symbols.

Professional appearance and compact size looks and fits well in any location.



Then compare the price.

For under $1000,* the Zenith Z19 smart terminal is a very smart buy. It can be utilized with almost all commonly available computer systems and provides the most advantageous features for data entry, editing, inquiry, and transaction processing—wherever you need a top-of-the-line, general-purpose terminal.

The Z19 is ideal for high speed data entry. The 12" diagonal CRT gives you a crisp, clear video image. And the Z19's keyboard follows the standard typewriter keyboard layout for operator ease. Along with this you get ANSI and DEC®-VT52 compatibility. And one other important plus: Quality you can depend on, because it's Zenith.

DEC is a registered trademark of Digital Equipment Company.

For more information about the Z19 video display terminal, send us the coupon. For fast information, call 800-331-1750, Operator 36, toll free. In Oklahoma call 800-722-3600, Operator 36.

*Suggested retail price.

ZENITH | data systems

1000 MILWAUKEE AVENUE, GLENVIEW, ILLINOIS 60025

The quality goes in before the name goes on.

Zenith Data Systems
1000 Milwaukee Ave., Glenview, IL 60025

c ☐ Please send me more information on the Z19 video display terminal, and include your dealer and service center list.

Name_____ Tel._____

Title_____

Company_____

Street_____

City_____ State_____ Zip_____

CW 1006

Network Processor Offers Host Selection Feature

NORCROSS, Ga. — A communications network processor that is said to feature host selection and port contention has been developed by Digital Communications Associates, Inc. (DCA).

The System 355 Master Network Processor reportedly can be used in three applications: point-to-point statistical multiplexing, multipoint multiplexing and full-function, multinode data communications.

The host selection feature allows terminal users who have asynchronous terminals to access their choice of any host computer in the network.

Port contention allows terminal users to contend for host ports on a first-come first-served basis, reportedly reducing the need for expensive host port connections for each terminal.

Base price for the processor is $10,000, with delivery in 45 to 60 days from DCA at 135 Technology Park/Atlanta, Norcross, Ga. 30092.

Probe to Sponsor Office Seminar

NEW YORK — Probe Research, Inc. is sponsoring a two-day seminar here Nov. 18-19 on "The New Office Communications Capabilities."

Subjects to be covered include "Advanced PBX Features," "Linking and Integrating Terminals" and "Voice Message Systems."

The seminar will cost $595 per attendee. More information is available from Rita Tannenbaum at Probe Research, Inc., P.O. Box 251, Millburn, N.J. 07041.

IBM 3600s Get Loop Modems

(Continued from Page 69)

network testing from the central site, where any of eight tests can be initiated to isolate and test a particular data channel or DLM in the loop.

Two major options are said to provide maximum network uptime. The first option, an automatic, downline-loaded dial restoral option, allows the central site operator to initiate a two- or four-wire dial backup operation from the central site.

The second option, the Internal Spare Modem, allows the user to install a second modem card in the basic package, according to the vendor. Then if the primary modem should fail, the central site operator can remotely switch over to the spare modem.

DLM Series modems are available on a purchase or lease basis. The DLM1200 is priced at $1,990 or $48/mo on a three-year lease, and the DLM2400 costs $2,465 or $63/mo. Prices include the diagnostic module.

Intertel is located at Six Shattuck Road, Andover, Mass. 01810.

Ethernet Users Get Xerox 5700

(Continued from Page 69)

handler that flips the originals for the operator and also has a collator and an automatic stapler. Copies from originals (such as artwork) can be mixed with text from word processors, although not on the same page, a spokesman explained.

The first 5700 deliveries will begin in December in Los Angeles.

Exact system price depends on the features chosen. A typical system, including two magnetic media stations, communications, copying facilities, forms compiler and automatic stapler, has a purchase price of $91,050 and a lease price of $2,040 monthly on a one-year lease. The lowest cost system is $66,300, or $1,400 a month.

GTE Telenet POS Terminal Gives Credit Authorization

VIENNA, Va. — A point-of-sale (POS) credit authorization terminal for organizations with credit card and check guarantee services needs will be available from GTE Telenet Communications Corp. in spring.

Micro-Fone has been selected by Visa for participation in a nationwide pilot project to evaluate a low-cost, dial-up terminal network for authorizing card transactions. Visa hopes the system can help reduce fraud, eliminate paper-based bulletins and expedite the merchant authorization process.

The microprocessor-based device combines a telephone hand set, magnetic card reader and Touch-Tone key set with 10 special function keys. It permits the merchant to automatically dial as many as 14 different organizations, transmit card numbers through the magnetic stripe reader and complete the authorization in as little as 20 seconds, the vendor claimed.

The Micro-Fone operates through the public telephone system or through the Telenet packet-switched network and similar networks. It will cost between $350 and $750 depending on quantity ordered and the conditions of agreement, the vendor said from 8330 Old Courthouse Road, Vienna, Va. 22180.

"StatMux"

From The DCC Data Movers

Our STAT MUX can *reduce your communications costs* by combining multiple costly circuits into one circuit, and *improve reliability* with error-free transmission. DCC's Data Movers currently service major operating U.S. Networks.



The CM-9100 Statistical Multiplexer offers:

- **4 to 32 subscriber lines**
- **Synchronous or Asynchronous input protocol**
- **X.25 Level 2 support**
- **Built-in diagnostics**
- **Optional High Speed backup line**
- **No impact to existing terminals, computers, or software**
- **Many other standard and optional features**

Immediate Delivery!

For further information contact the Data Communications Marketing Department.

Digital Communications Corporation
A M/ACOM Company
11717 Exploration Lane
Germantown, Maryland 20767
(301) 428-5600 TWX 710 828-0541

Atten: Data Com Marketing
Please send me more information on DCC's Data Movers.
Name
Address
City
State Zip

11717 Exploration Lane
Germantown, Maryland 20767



Package Lets Naked Minis Act as RJE Terminals

IRVINE, Calif. — A package that allows Computer Automation, Inc.'s Naked Minis to function as remote job entry (RJE) terminals to any host CPU that supports IBM's 2770, 2780 or 3780 protocols is available from CA.

The emulators execute under the NM4 real-time executive on NM4/10, NM4/30, NM4/90 and NM4/95 processors equipped with an I/O distributor card.

The three emulators are available on diskette for $1,000. This price includes a user's manual.

CA is located at Suite 420, 1600 Dove St., Newport Beach, Calif. 92660.

Point-to-Point, Multipoint

T-Bar Offers Digital Alarm Panel

WILTON, Conn. — A digital alarm panel for point-to-point or multipoint networks is said to automatically detect fault conditions in EIA RS-232C circuits has been introduced by T-Bar, Inc.

The 5977 digital alarm panel — billed by the company as the first of its kind — is geared to detect carrier failures in point-to-point networks and for streaming modem conditions in multipoint setups.

The unit allows continuous monitoring of one RS-232C-type circuit from any one of 16 modems or up to 16 circuits within a single RS-232C interface, a spokeswoman claimed.

Options for the alarm panel include adjustable mark and space signals and the ability to mix different types of data communications circuits that can be monitored from the same panel.

The firm is also offering a remote monitoring unit for the 5977 called the 5977R, which allows for remoting one alarm circiut or group of up to 16 alarm circuits from each 5977.

The 5977 panel sells for $1,295, and the remote monitoring unit costs $395. Quantity discounts are available, T-Bar said from 141 Danbury Road, Wilton, Conn. 06897.

PTC '81 Set For Jan.12-14

HONOLULU — Roger Vallo, president of GTE Communications Network Systems, and Frank Yung, chairman of the Telecommunications Authority of Singapore, will keynote the opening plenary session of the third Pacific Telecommunications Conference (PTC '81) here on Jan. 12-14.

Featuring a variety of roundtable discussions, panels and paper presentations, the conference is being organized by the newly formed Pacific Telecommunications Council and sponsored by eight organizations, including Hawaii's Dept. of Planning and Economic Development, The University of Hawaii and the Hawaiian Telephone Co.

Sessions will include "The Information Economy," "Social Effects of Telecommunications" and "Uses of New Technology and New Services from the Perspectives of Japan, France and the U.S.A."

Further details are available from PTC Director Richard Barber at P.O. Box 23148, Honolulu, Hawaii 96822.

The Invisible Modem is Here!



Dear Ma:

Racal-Vadic introduces the Amazing Modemphone—World's first voice-data telephone with a built-in Bell 103/113 compatible 300 bps full duplex modem.

An invisible modem?

That's right. It's packaged INSIDE a standard rotary or tone telephone.

Now, all you need is the Modemphone and your terminal. Use it for regular voice communication, or, with a flip of a switch, transmit and receive data at rates up to 300 bps full duplex.

Bell 103/113 compatible, the Modemphone is FCC registered for direct-connect to the switched network. You can choose either manual or automatic Originate/Answer.

Racal-Vadic engineers have done a remarkable job of packaging a COMPLETE MODEM inside a conventional telephone. All standard modem circuitry is mounted on a 17.5 square inch PC board, while a 6 square inch board adds the automatic Originate/Answer option.

The Modemphone is amazingly simple to install and to operate, with instructions on a pullout plastic card.

No doubt about it — the world's first voice-data telephone is the shape of things to come, eliminating the need for a separate modem and associated wiring. At $250, the price is right, too.

For fast info call the 800 number right now.

Your independent thinking son,

Alexander Graham Jr.

Racal-Vadic Member IDCMA

RACAL The Electronics Group

222 Caspian Drive
Sunnyvale, CA 94086
Tel: (408) 744-0810 • TWX: 910-339-9297

PHONE: (800) 543-3000, OPERATOR 390

Racal-Vadic Regional Offices: West: (408) 744-0810 • East: (301) 459-7430
Central: (312) 932-9268 • Northeast: (617) 245-8790 • Southwest: (817) 277-3246

Available from these stocking reps...

Alabama: (800) 327-6600 • Alaska: (907) 344-1141 • Arizona: (602) 947-7841 • California: S.F. (408) 727-6491, L.A. (714) 635-7600, S.D. (714) 578-5760 • Colorado: (303) 779-3600 Connecticut: (203) 265-6215 • District of Columbia: (301) 622-3535 • Florida: Fort Lauderdale (800) 432-4480, Orlando (305) 423-7615, St. Petersburg (800) 432-4480 • Georgia: (800) 327-6600 • Illinois: (312) 255-6820 • Indiana: (317) 846-2591 • Kansas: (913) 362-2366 • Maryland: (301) 649-6000 • Massachusetts: (61[illegible]) 245-8900 • Michigan: (313) 973-1133 • Minnesota: (612) 944-3515 • Mississippi: (800) 432-4480 • Missouri: (314) 821-3742 • Nevada: (800) 422-4591 • New Jersey: North (201) 445-5210, South (609) 779-0200 • New Mexico: (505) 299-7658 • New York: Binghamton (607) 785-9947, N.Y.C. (212) 695-4269, Rochester (716) 473-5720, Syracuse (315) 437-6666 • North Carolina: (800) 327-6600 • Ohio: Cleveland (216) 333-8375, Dayton (513) 859-3040 • Oregon: (503) 224-3145 • Pennsylvania: East (609) 779-0200, West (313) 973-1133 • South Carolina: (800) 327-6600 • Tennessee: (615) 269-3726 • Texas: Austin (512) 451-0217, Dallas (214) 231-2573, Houston (713) 688-9971 • Utah: (801) 484-4496 • Virginia: (301) 649-6000 Washington: (206) 364-8830 • Wisconsin: (414) 547-6637 • Canada: Calgary (403) 243-2202, Montreal (514) 849-9491, Toronto (416) 675-7500, Vancouver (604) 681-8136

WHEN YOU NEED DEC...

TERMINALS
• VT-100 • VT-103
• LA34 • LA120
• LA180

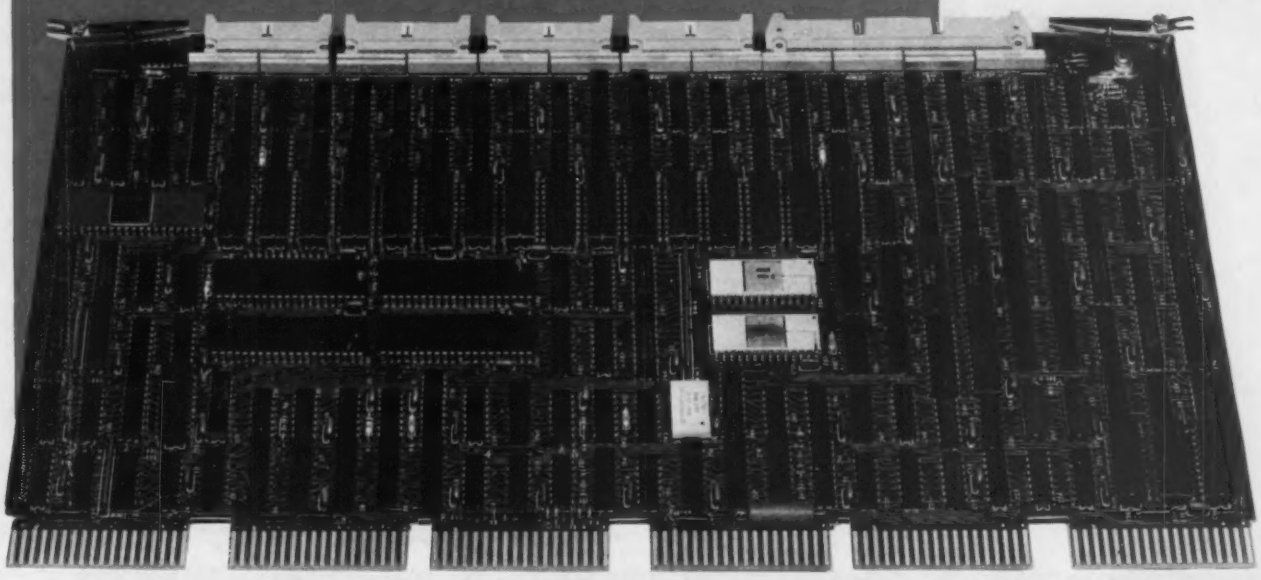
PDP 11/03
PDP 11/23
SYSTEMS

LSI/11 MODULES

Demand. . .Delivery
Demand. . .Discounts
Demand. . .UNITRONIX

UNITRONIX CORPORATION
(201) 874-8500
198 Route 206
Somerville, NJ 08876
TELEX 833184

A FAMILY OF SOFTWARE-COMPATIBLE SMD CONTROLLERS FOR PDP-11 AND LSI-11



Now you can get all you want from a single family of DEC-compatible SMD controllers for your PDP-11 and LSI-11 minicomputers. All the features, all the performance, all the compatibility. And all available now, from Dataram.

It is a proven family, started in mid-1979 with the S33/A, the industry's first DEC-compatible, single-board SMD controller with complete software compatibility. And evolving to today's six price-performance leaders — three single-board PDP-11 compatible controllers and three dual-quad LSI-11 controllers, with RM02, RK07, and RP06 emulation.

All are software compatible with DEC's operating systems and diagnostics...all have the capability to drive up to four SMDs...all have multiple sector transfers, 2K of data buffering, and built-in self-test capability, standard...and all have operated with SMD drives from Control Data, Ball Computer, Century Data, and Ampex, with capacities from 80MB to 300MB.

If you need SMD capability for your PDP-11 or LSI-11, one of our family of SMD controllers can fit right in. Call us today.

	RM02	RK07	RP06
PDP-11	S33/A	S33/B	S33/C
LSI-11	S03/A	S03/B	S03/C

DEC, LSI-11, and PDP are registered trademarks of Digital Equipment Corporation.

DATARAM CORPORATION

Princeton Road
Cranbury, New Jersey 08512
Tel: 609-799-0071 TWX: 510-685-2542

Z-Lab Links Development Stations on Z-Net

CUPERTINO, Calif. — A method of physically distributing hardware and software development stations while keeping them a part of an integrated system has been introduced by Zilog, Inc. for users of its Z-Net local computer networks.

At the same time, the company also unveiled an asynchronous bidirectional first-in/first-out buffer circuit that is said to provide elastic buffering between a CPU and peripheral circuits.

The Z-Lab linking system was designed for users developing products based on the firm's Z8, Z80 and Z8000 microprocessors and is implemented via three products: a Z80-A-based program development station; a previously introduced SDS 2/01 shared data station; and a network station transceiver.

The development station includes 64K bytes of random-access memory, 4M bytes of floppy disk storage and RS-232C ports for CRT terminals, printers and other peripheral devices, a spokeswoman said.

The user also receives software development packages for all three previously mentioned microprocessors, she added.

Basically, the development systems are linked along Zilog's single-channel Z-Net system architecture. Each development station is connected to a coaxial cable by a transceiver unit.

The shared data station provides a common data base, expandable from 10M to 40M bytes, for the various stations on the network.

The stand-alone Z-Lab 80 program development station costs $13,750 and will be available in January 1981. The networking capability for Z-Lab will be available from 90 to 120 days later.

The SDS 2/01 shared data station sells for $13,750; the network transceivers cost $950 each; and the network protocol software costs $700 per station.

Zilog's Z8038 I/O interface unit (Z-Fio) was designed to operate with both Z-Bus-compatible CPUs and non-Z-Bus compatible processors. The device is said to synchronize peripherals or equipment that operate independently or at different data rates.

The Z-Fio can operate in interlocked or IEEE-488 handshake port mode and has 128-byte by 8-bit expandable organization.

The unit generates seven sources of vectored/non-vectored interrupts and can manage direct-memory access transfers of up to 1M-byte/-sec and can transfer data to and from memory during every machine cycle.

Housed in a 40-pin dual-in-line package, the Z-Fio costs $39. Sample quantities will be available next month, the spokeswoman claimed.

Zilog, an affiliate of Exxon Enterprises, Inc., is located at 10340 Bubb Road, Cupertino, Calif. 95014.

Device Reduces Coax Dependence

MINNEAPOLIS — The Coax Eliminator, a product that enhances the capabilities of its Series 300 family, is available from Lee Data Corp. (LDC).

The Coax Eliminator reduces dependence on coaxial cable for connecting displays to an LDC controller and provides the ability to connect up to eight LDC displays (or printers) to one coaxial cable or one twisted wire circuit from any LDC 3274-compatible controller, the vendor claimed.

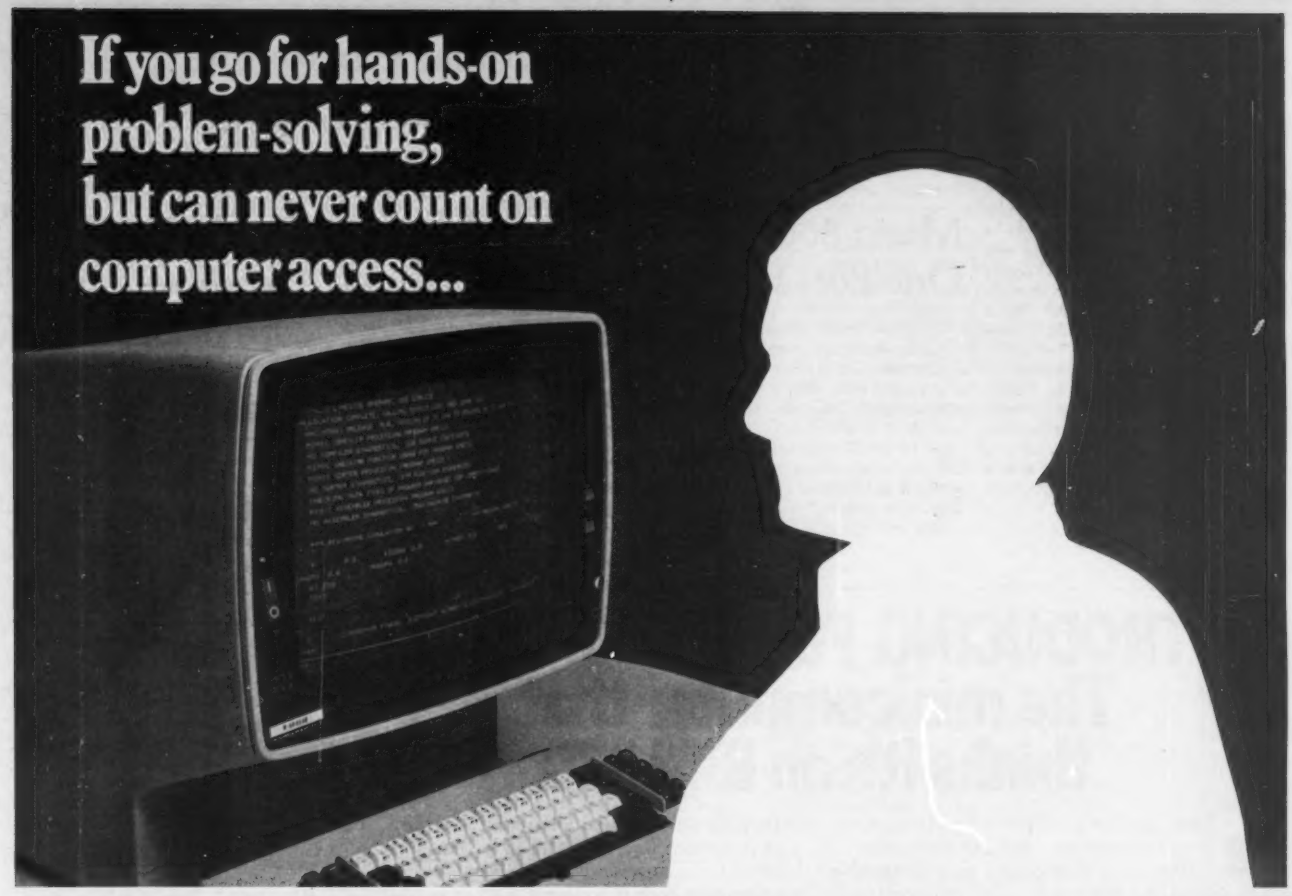
The unit is useful in configurations where large amounts of coaxial cable are used, where distances greater than 5,000 ft are required or where only twisted wire circuits are available, a spokesman said.

Available in three models, the units sell for $880 to $1,040 depending on configuration, the vendor said from 10206 Crosstown Circle, Minneapolis, Minn. 55344.





If you go for hands-on problem-solving, but can never count on computer access...



...have we got space for you!

You need to know how often you'll be left high and dry. So you ask, "Are there really enough computing tools to go around?"

A perfectly fair question, which most companies would rather dodge.

Not Hughes. How could we expect you to work out projects involving electronics, if you couldn't get your hands on electronic help? At your service here: massive data-processing capabilities.

This organization, run by engineers and scientists, producing space vehicles for the nineties and the twenty-first century, knows the score. Knows that nothing turns on creativity like a chance to turn to a state-of-knowledge system, whenever required.

Our programmers, analysts, software engineers, and others tap into the most advanced minis and micros. And they use hundreds of terminals wired to giant CPU's and strategically placed for ready access by our project groups.

Now, about those groups: Hughes may be big, with more than 1,500 current projects in its $4 billion backlog. But we team professionals into small technical groups. This gives you the visibility and upward mobility of a little company. At the same time, you get the benefits of a giant corporation.

Including real job security. Thanks to worldwide demand for our unique expertise in space communications and exploration — past, present, and future.

And our plans for helping you continue your education are second to none in industry. Take advantage of our wide-ranging Career Assistance Programs, or work toward an advanced degree at one of the nationally ranked universities in the area, with tuition paid by Hughes.

If you're intrigued by unlimited space to learn, operate, and grow — in an environment offered only by Hughes here in this most comfortable part of the world — get your hands on more input from us. All it takes to get started is your resume addressed to:

Tom Royston 373/A300
Hughes Aircraft Company
Space & Communications Group
Professional Employment Dept. WC-10A
P.O. Box 92919
Los Angeles, CA 90009

HUGHES

HUGHES AIRCRAFT COMPANY



SPACE & COMMUNICATIONS GROUP

Equal Opportunity M/F/HC Employer
U.S. citizenship required

Interface Systems Offers Printer for IBM 3270s

ANN ARBOR, Mich. — Interface Systems, Inc. is offering a printer for users of IBM's 3270 CRT terminal.

The Model 2120 demand document printer provides immediate access to the last printed document. The unit comes with a tear-off bar and forms tractors below the print head that reportedly allow forms to be torn off the printer as they are printed, the vendor said.

The unit was designed for tickets, receipts, admitting slips, bills of lading, tags and check printing. It is available in type B for IBM's 3271 or 3272 control units or type A for IBM's 3274 or 3276. The unit will accept IBM's SDLC protocol and is available in all buffer sizes, Interface said.

The 2120 costs $5,450, the vendor said from 462 Jackson Plaza, Ann Arbor, Mich. 48103.

Micro 800 Concentrator Lets One Port Handle 16 Channels

CHATSWORTH, Calif. — Micom Systems, Inc. has announced a port concentrator for users of its Micro800 data concentrator that is said to allow one computer port to communicate with up to 16 channels.

The Micro200 port concentrator utilizes an asynchronous or synchronous protocol and is aimed at minicomputer users who might be limited in the number of hardware ports available to their systems. Some user programming is reportedly required to communicate with the port concentrator.

The Micro200 costs $1,000; however, OEM discounts are available, a spokeswoman said.

Micom is located at 9551 Irondale Ave., Chatworth, Calif. 91311.

Intelligent Controller Offers Text Editing Program

SAN JOSE, Calif. — Digicom Data Products, Inc. has introduced an intelligent communications controller that allows users to connect various terminals and modems.

Digilink offers text editing through an assigned terminal port, interactive communications through a modem control port and data collection via the printer control port, the vendor said.

The controller costs $995 including the text editing program, 4K bytes of memory which are optionally expandable to 16K bytes, and a user prompter program. Additional memory costs $125 per 4K-byte increment. The vendor is at 1440 Knoll Circle, San Jose, Calif. 95112.

System/34s Tied To Peripherals

AUSTIN, Texas — KMW Systems Corp. is offering the BAC-34, a data converter that reportedly allows users to attach non-IBM peripherals to an IBM System/34 minicomputer.

The BAC-34 sends and receives Ebcdic data via IBM's binary synchronous protocol, performs all error-checking functions, translates data to Ascii and outputs in serial asynchronous format to and from user-attached devices, the vendor said.

Data may be transferred at user-selectable rates of 75-, 110-, 150-, 300-, 600-, 1,200-, 2,400-, 4,800-, 9,600- or 19.2K bit/sec. The unit costs $3,950, the vendor said from 8307 Highway 71 W., Austin, Texas 78735.

Bizcomp Adds To Modem Line

MENLO PARK, Calif. — Business Computer Corp. (Bizcomp) has released a Bell 103-compatible intelligent modem that features auto-dial, auto-answer and a three-wire RS-232C interface.

Modeled after the firm's Series 1030 intelligent terminal modem, the 1022 modem is aimed at computer applications and has a Federal Communications Commission registration for direct connection. The unit's built-in auto-dialer has both tone and dial-pulse capabilities and is controlled by Ascii characters code-multiplexed over the RS-232C port.

Applications for the device include computer and terminal networking, off-hours automatic polling, store-and-forward message routing, remote data base access and remote computer diagnostics. The 1022's tone dialing capability also makes the unit suitable as a CPT-TWX network interface, a spokesman claimed.

The intelligent modem costs $595 from the company through P.O. Box 7498, Menlo Park, Calif. 94025.

INTRODUCING FORMATION 4000. The minicomputer that thinks it's an IBM 370.

Now you can run IBM 370 software on a minicomputer system—without reprogramming. Formation 4000 is not a plug-compatible processor. It's a low-cost, 32-bit minicomputer system, including a processor, controllers, and peripherals, that runs IBM 370 software.

With the Formation 4000 system, you can offer your customers this vast array of mainframe software at minicomputer prices. The F/4000 accommodates DOS/VS, OS/VS1, and VM 370 operating systems. You can also extend VM 370 capabilities with Formation's Transaction Management System. This software package simplifies the development of on-line/data base-oriented applications.

Formation 4000 virtually eliminates downtime through an economical redundancy feature. The redundancy design allows any or all system elements to be duplicated. Each component is fully functional and adds to the capability of the system under normal conditions, but serves as backup equipment when needed.

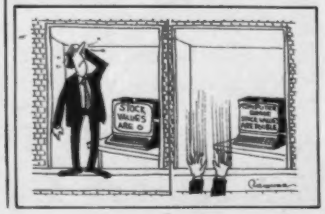
No need to worry about hardware. Formation installs and supports the total system.

So if you market software, customized computer systems, or data processing services, you can use Formation 4000 to expand your customer base and keep costs down. To find out more, write Formation, 823 East Gate Drive, Mt. Laurel, New Jersey 08054. Or call us at 609-234-5020.

formation
responsive computer systems

Visit Formation in Booth 1312 at INFO 80.





Bits & Pieces

Welch Allyn Division Unveils Terminal to Read Bar Code

SKANEATELES FALLS, N.Y. — A data entry terminal designed to provide bar code reading capability to existing computer-based data collection systems has been introduced by Welch Allyn, Inc.'s Industrial Products Division.

The HBD series terminal provides a wide range of data collection applications, including blood processing, production control and material handling, in-process manufacturing data collection and computer assistance peripherals. Data communications to and from the key entry terminal and the mainframe uses a serial Ascii format and has RS-232-compatible signal levels.

The HBD series costs $815 from the vendor at 99 Jordan Road, Skaneateles Falls, N.Y. 13153.

Text, Plotting Interface Available for Qume Printers

SAN LEANDRO, Calif. — The Qume Commander CS-1, an interface designed to provide Qume printers with text processing and plotting capabilities, is available from Data Capital Co.

Word and character manipulation capabilities include multilevel, auto-subscripting, multilevel auto-superscripting, auto-boldface, auto-showprint, auto-underline, auto-overstrike and word wraparound.

The product costs $695, the vendor said from 702 Whitney St., San Leandro, Calif. 94577.

Sola Line Voltage Regulator Helps Supply Clean Power

ELK GROVE VILLAGE, Ill. — A series of static/magnetic line voltage regulators has been introduced by Sola Electric to help computer power centers supply clean power requirements.

Sola's Solatron/Acuvolt line voltage regulator was designed to improve power center performance by stabilizing voltage at the power center's input, attenuating noise and providing brownout protection, a spokesman said.

The regulating systems output a stabilized 480 Vac, the typical input voltage for most power centers. The Solatron/Acuvolt regulator is priced starting at $6,500.

Sola Electric, a unit of General Signal Corp., is at 1717 Busse Road, Elk Grove Village, Ill 60007.

Mini Complex Rivals Processing Speed of 370

NEW YORK — Program Resources, Inc. (PRI) has introduced a minicomputer complex it said rivals IBM's 370/158 in terms of processing speed.

The system consists of a 32-bit scientific supermini from Systems Engineering Laboratories, Inc. (SEL) linked to the Attached Resource Computer (ARC) minicomputer network from Datapoint Corp., according to a PRI representative. PRI designed the hardware necessary to connect the two systems and installed the first working network at Shearson Loeb Rhoades, Inc. a New York-based stock brokerage.

The minicomputer complex at Shearson reduced turn-around time from three hours to five minutes while increasing the number of dial-up ports to eight from the previous two, the PRI spokesman claimed.

Hardware at Shearson's installation includes an ARC network with one 40M-byte file processor and four application processors with eight CRT terminals and eight dial-up ports. The SEL Model 32/77 supermini is configured with 512K bytes of main memory and 600M bytes of peripheral disk storage, according to PRI.

Connection between the business and scientific minis is accomplished via an RS-232C interface at 9,600 bit/sec with two channels, PRI said.

Targeted toward the financial community, the complex can satisfy requirements varying from 20-terminal configuration up to a maximum of 1,000 terminals, he claimed.

Three Available Systems

Three configurations are currently available — and all of them offer throughput up to 1.2 million instructions per second, according to Kalman Toth, PRI vice-president.

A small configuration consists of a Datapoint ARC with:

- One file processor and three application processors.
- Ten CRT terminals.
- Disk storage of 20M bytes.
- One 160-char./sec printer.
- Six dial-up ports.

And an SEL Model 32/27 with:

- Main memory of 512K bytes.
- Disk storage of 32M bytes.
- One 300-line/min printer.
- One console CRT terminal.
- One diskette unit.

One channel is also included in the list price of $161,528, PRI said. The three-year lease price is $4,946/mo and monthly maintenance is $1,395, according to the vendor.

A medium-size system would upgrade the previous configuration from three to five application processors, 10 to 30 CRT terminals, 20M bytes to 120M bytes of disk storage and includes a 300 line/min printer and 18 dial-up ports on the ARC side, PRI said.

The scientific portion of the system would be based on an SEL Model 32/57 with 1M byte of main memory, 300M bytes of disk storage, one 600 line/min printer, one console CRT terminal and a 45-in./sec tape unit, PRI explained. With two channels, this system costs $333,590 and is available with a three-year lease at a monthly rate of $10,914, PRI said. Monthly maintenance for this system costs $2,999.

A large system includes two file processors and 15 application processors, 100 CRT terminals, 360M bytes of disk storage, two printers, 60 dial-up ports and a 25 in./sec tape unit on the ARC side, according to PRI.

The 4M-byte SEL Model 32/77 would be tied to 2,400M bytes of peripheral storage, one 900 line/min printer, one console CRT terminal and two 75 in./sec tape units. Five channels are in this configuration that costs $1,065,210 or $34,831/mo with a three-year lease. Monthly maintenance for this system is $9,693, PRI said.

The sytems are available in 90 days from PRI at 369 Lexington Ave., New York, N.Y. 10017.

Course to Cover Univac Execution

WASHINGTON, D.C. — An intensive five-day course that will describe the tools and techniques for improving the performance and productivity of large-scale Univac 1100 computer systems is being offered here Nov. 17-21 by Datametrics Systems Corp.

Accounting systems, software monitors and hardware monitors to diagnose performance problems on the 1100 will be covered in the program, with special emphasis on the Software Instrumentation Package and the Performance Analysis Routine applications.

Tuition is $695 per person. Further information can be obtained from Datametrics Systems Corp., 5222 Dunleigh Drive, Burke, Va. 22015.

Top Quarterback in the EDP

The Beall Channel Switch. To tell your computers where to get off... and on. Lets specific peripherals serve more than one computer. Gives you more usable redundancy, especially for critical on-line services. Provides far more flexible physical deployment of peripherals.

Why Beall?

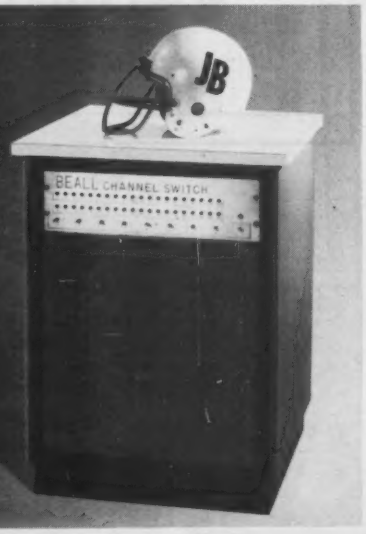
1 It's more reliable. Up to 94 per cent fewer circuit boards than the competition. Less to go wrong.

2 It's easier to operate. Simpler controls reduce chances of costly operator mistakes.

3 It's simpler to service. Self-diagnostic equipment is built in. Spare parts stocked on site.

We make five basic models to provide up to eight switchable interfaces each of which can be logically connected to as many as eight CPUs.

Oh yes, one more thing. Our "quarterback's" contract is the lowest in the league.



John Beall & Company, Inc.

9103 Third Avenue • North Bergen, N.J. 07047 U.S.A. • 201/854-3562

38 delivers

The productivity advances of IBM's new System/38 are being confirmed in early installations.

IBM has started delivering System/38's to customers.

And customers have started delivering comments like these to IBM.

"I created a special equipment report in 15 minutes flat. Before, it would have taken a day and a half of programming;" —Chuck Petter, Data Processing Manager, Road Machinery and Supplies Company, Minneapolis.

"System/38 makes our programming staff more productive. We've developed applications in weeks instead of months. And they're more effective."—Norbert Gottenberg, V.P.-Planning & Management Information Systems, United Merchants and Manufacturers, New York City.

"The System/38 significantly reduced the amount of code necessary to write a program and the time and effort required to move into new applications. We're extremely enthusiastic."—Larry Petterson, Director of Data Processing, St. Olaf College, Northfield, Minnesota.

And we're enthusiastic, too.

Because the IBM General Systems Division's versatile new System/38 is a compact system with many large computer features. Such as distributed online work stations so users don't have to go to the computer; a central data base that makes information easier to retrieve, revise and use; the Control Program Facility, which automatically monitors and manages the flow and processing of data; online program testing, so programs can now be debugged as normal processing continues.

And System/38 has advanced features rarely found in any computer, large or small. Like Single Level Storage, which treats all storage as a single unit and automatically keeps track of it.

And thanks to System/38's streamlined architecture, many functions that previously required programmers' time have been absorbed into the system itself.

The result of these IBM innovations? A computer that lets you do much more, much more simply.

We're pleased that System/38 is already helping business function with greater cost-efficiency, productivity and profitability.

In short, System/38 delivers. And it can deliver for you.

For more information call your IBM General Systems Division representative or write us at P.O. Box 2068, Atlanta, GA 30301.



IBM

General Systems Division

Costs Less Than Single Workstation

Burroughs OCR Page Reader Boosts WP Tasks

BURLINGTON, Mass. — An optical character recognition (OCR) page reader claimed to triple the productivity of a word processing (WP) center at less than the cost of a single workstation is being offered by Burroughs Corp.'s OCR Systems arm.

The Burroughs 1205 text input device will sell for $10,900, far below competitive systems that cost from $16,000 to over $50,000, the firm said.

Although aimed at the WP user, the 1205 can also be used to feed digitized data to a mainframe computer system. The 1205 reads typed or printed documents electronically, translates the words and formats into digital form and automatically transfers the digitized documents to a word processor or computer for editing and final formatting.

The page reader can reportedly input 250 pages per hour into a word processor or CPU with less than one error in 100,000 characters scanned.

The 1205 features straight-through paper feed and scanning techniques. Standard-weight paper up to 8-3/4 in. wide and up to 14 in. long can be fed into the scanner from a 100-page-capacity paper stacker. Up to 300 sheets of paper per hour travel at a constant speed of 1.3 in/sec over the 1205's conveyor belt transport mechanism, under the scanner and out the other side of the reader in a straight line.

The unit detects both horizontal and vertical text formats, recognizes new paragraphs, automatically signals tab positions and provides for corrections during the preparation of drafts.

The page reader also detects unrecognizable characters and automatically transmits an error code to the WP workstation without operator intervention and without interrupting the high-speed scanning process, according to the vendor.

The 1205 transmits scanned copy in the on-line mode using the Ascii asynchronous communications protocol or bisynchronous protocol such as IBM 2770 and 2780.

Burroughs OCR Systems is located at 9 Ray Ave., Burlington, Mass. 01803.

Fonts Added to Label/300

ATLANTA — Technical Analysis Corp. has expanded the list of standard character fonts and optional special character fonts for its Label/300, a microcomputer-based 300 line/min printer.

In standard fonts, the compressed print increases the value of the product's applications in areas such as grocery wholesaling, the vendor said.

The bar code and OCR-A fonts are currently useful for inventory control and order entry from the field. Compressed print, with 12 char./in., allows more complete information to be added on shelf labels.

Optional special character fonts now include vertical bar code and vertical print as well as alternate character sets, a spokesman said. They represent pluses for plants such as furniture or appliance production, where a product may need labels that can be read either horizontally or vertically.

Technical Analysis Corp. is located at 129 W. Wieuca Road N.E., Atlanta, Georgia 30342.

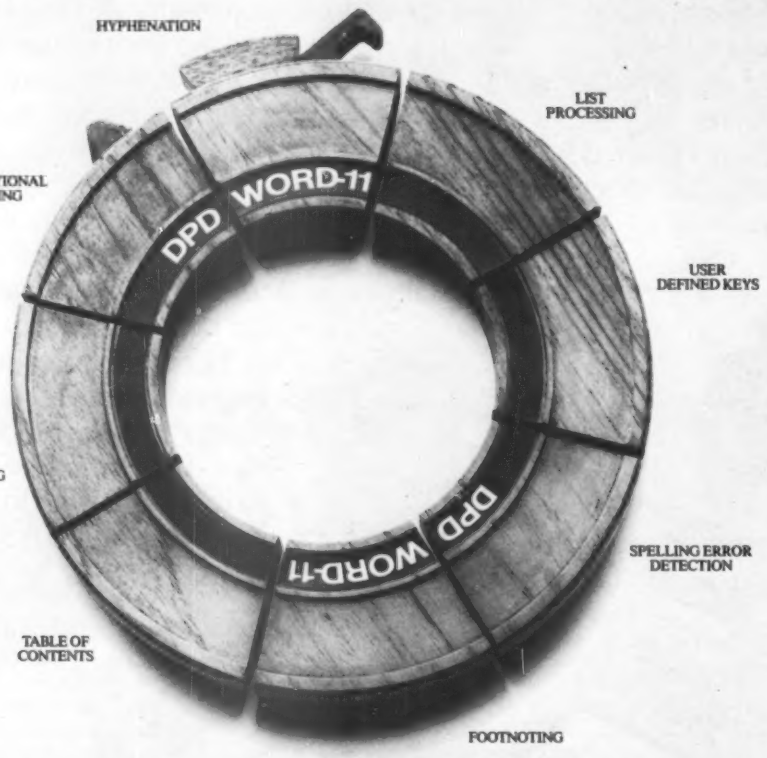
Time Station Added To GA Transactor Line

ANAHEIM, Calif. — A ruggedized time and attendance station has been added by General Automation, Inc. to its Transactor factory data collection system.

The Transactor 2811 is part of a full line of standardized terminals designed for computer-based collection of production, material and labor data on the shop floor. The station communicates with remote host computers over four-wire, full duplex lines at rates up to 9,600 bit/sec.

The 2811 costs $2,800 from the vendor at 1055 S. East St., Anaheim, Calif. 92803.

The Whole Truth About PDP-11 Word Processing.



When you explore word processing systems, you'll find a number of systems that offer part of the package. And frankly, if you're only looking for text editing, almost any system will do.

But if you're looking for full word processing capabilities, you should insist on a system that can handle all of the tough tasks you'll encounter.

For starters, a good system will have list processing, the vital function that generates correspondence, reports, even statistical analyses. It should have user defined keys to simplify repetitive operations.

And a good system can handle the details. Like spelling error detection, automatic renumbering of footnotes, tables of contents and indexes. And proportional spacing and hyphenation for professional looking documents.

A good system can be shared. It should be able to support up to fifty terminals. And it must be backed up by successful installations and a strong service team.

After you've examined the options, we think you'll select WORD-11, the only system with all the sophisticated features you could want.

For the details, please call Data Processing Design at (714) 993-4160. 181 W. Orangethorpe, Suite F, Placentia, CA 92670.

dpd Data Processing Design, Inc.
AUTHORIZED DIGITAL COMPUTER DISTRIBUTOR

PLAN FOR DISASTER.



A computer disaster plan can be essential to the survival of your business. Disaster Plan/80 provides you with a well thought-out model and specific procedures to follow in developing, testing, and maintaining an effective disaster recovery plan for your company. Call or write today for details.

EDP SECURITY, INC.
The contingency planning specialists
400-2 Totten Pond Road
Waltham, MA 02154
(617) 890-6466

The Kodak IMT microimage terminal. It's the brains behind Electronic Filing from Kodak.

Your office already has electronic typing.

You probably have electronic data processing, too.

Then isn't it about time you looked into Electronic Filing from Kodak?

The Kodak IMT microimage terminal, for example, is so intelligent it practically thinks for itself. Thanks to its own built-in microcomputer, an IMT terminal can perform on-line information lookups in seconds. At the touch of a button. Without tying up your mainframe.

An IMT terminal pinpoints images so precisely, in fact, that it practically eliminates lookup errors, which increases office productivity. In the meantime, your computer is left free to process data—not search for it.

Find out how many other intelligent things an IMT microimage terminal can do. Send in the coupon for more information. Or contact your Kodak representative for a demonstration of the Kodak IMT microimage terminal.

Either way, the move you make will be a smart one.



1880 Kodak 1980

©Eastman Kodak Company, 1980

EASTMAN KODAK COMPANY • Business Systems Markets Division
Dept. DP0615, Rochester, NY 14650

☐ Please send me more information about the Kodak IMT microimage terminal.

☐ Please have a Kodak representative contact me.

NAME _____ TITLE _____

COMPANY _____

ADDRESS _____ CITY _____

STATE _____ ZIP _____ PHONE _____

Board Ties Printronix Printers, Tektronix Terminals

IRVINE, Calif. – Trilog, Inc. has unveiled its high-resolution Graphics Adapter Board (GAB). The board interfaces the Printronix, Inc. line of printer/plotters with the Tektronix, Inc. 4025 raster terminal, Trilog said.

The GAB produces high-resolution hard copies on plain paper and extracts up to six high-resolution copies from the 4025.

Its technology allows two raster CRT terminals to be served automatically and provides for the multiplexing of CRT data with no waste of CPU time, Trilog claimed.

The product has a built-in self-test feature, which can be selected by using a switch on the module, allowing checks on both graphics and character printing, a spokesman said.

Output measures 10.3 in. by 10.7 in. in the normal mode. To accommodate a paper size of 8.5 in. by 11 in., the truncated mode produces output 10.3 in. high by 7.3 in. wide.

The GAB sells for $1,200. Trilog is at 17391 Murphy Ave., Irvine, Calif. 92714.

Decollator and Burster Unveiled

LAWRENCEBURG, Ind. – Financial Stationers, Inc. is offering a decollator and a burster for minicomputer users, satellite operations or as a backup for peak load situations in large applications.

The decollator costs $275 and the burster costs $798. Both are available for $1,050 and were designed for use by one unskilled operator.

The vendor is located at 318 Walnut St., Lawrenceburg, Ind. 47025.

U. of Arizona, Honeywell Plan Engineering Course

TUCSON, Ariz. – The 18th Annual Reliability Engineering and Management Institute will be offered here Nov. 10-14 by the University of Arizona in conjunction with Honeywell, Inc.'s Information Systems. Conducted by Dr.Dimitri Kececioglu of the Aerospace and Mechanical Engineering Department at the University, the short course earns participants three continuing education units.

The course will cover reliability engineering theory and practice; mechanical reliability prediction; reliability testing and demonstration; maintainability engineering; life-cycle costing; product liability; and reliability and maintainability management.

A fee of $575 includes all materials, lunches and refreshments. Enrollment and fees must be completed by Oct. 31.

Further details are available from Kececioglu at Building No. 16, Room 200B, University of Arizona, Tucson, Ariz. 85721.

Air Filters Fit Disk Drive Use

MINNEAPOLIS – The Donaldson Co., Inc. has announced a line of custom-designed air filters in a variety of filtration efficiencies for disk drive applications.

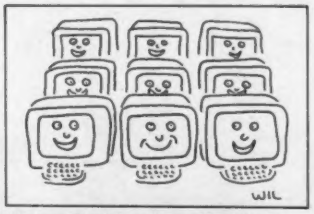
The filters are offered in a range of filtration levels to catch particle sizes of .3 microns or larger. Several glass fiber filter media types are also available to meet various efficiency and pressure drop requirements.

The filter housings are constructed of injection-molded plastic and equipped with leak-proof seals.

Costs of the filters usually range from $1.70 to $6 each, but prices vary because most of the units are custom-designed for a particular system, Donaldson said from 1400 W. 94 St., Minneapolis, Minn. 55431.

Free Brochures

• A description of the Ragen 95 information management system is found in "Breakthrough in Information Management," a six-page brochure available from Ragen Information Systems, 500 Belleville Turnpike, N. Arlington, N.J. 07032.



'Happy Birthday Dear 23704966 . . . Happy Birthday to You.'

The new VISUAL 200 terminal has the features of competitive terminals and will code-for-code emulate them as well. A flick of a switch on the rear panel programs the VISUAL 200 for compatibility with a Hazeltine 1500, ADDS 520, Lear Siegler ADM-3A or DEC VT-52. This allows you to standardize on the new, reliable VISUAL 200 for virtually all of your TTY compatible video terminal applications, with no change in the software you've written for the older, less powerful terminals. And you're not limited to mere emulation; you can outperform them at the same time by taking advantage of the additional features and human engineering of the VISUAL 200, such as:

- Detachable Solid State Keyboard
- Smooth Scroll
- Tilt Screen (10° to 15°)
- Large 7 x 9 Dot Matrix Characters
- Others in the Feature Comparison Chart

For a pleasant surprise on prices, call or write us today.

FEATURE COMPARISON CHART

FEATURE	Visual 200	Hazeltine 1500	Hazeltine 1420	Lear Siegler ADM-3A	Digital VT-52	ADDS 520	ADDS Regent 25	ADDS Regent 40
24 x 80 Screen Format	STD	STD	STD	STD	STD	STD	STD	STD
7 x 9 Dot Matrix	STD	STD	NO	NO	NO	NO	NO	NO
Background/Foreground	STD	STD	STD	NO	NO	NO	NO	STD
Insert/Delete Line	STD	STD	NO	NO	NO	NO	NO	STD
Insert/Delete Character	STD	NO	NO	NO	NO	NO	NO	NO
Clear End Line/Field/Page	STD	STD	NO	NO	STD	NO	NO	NO
Blink	STD	NO	STD	NO	NO	NO	NO	STD
Security Mode	STD	NO	STD	NO	NO	NO	NO	STD
Columnar and Field Tab	STD	NO	STD	NO	NO	NO	NO	STD
Line Drawing	STD	NO	NO	NO	STD	NO	NO	STD
Upper/Lower Case	STD	STD	STD	OPT	STD	NO	STD	STD
Numeric Pad	STD	STD	STD	OPT	STD	NO	NO	STD
Composite Video	STD	NO	NO	NO	NO	STD	NO	NO
Current Loop	STD	STD	NO	OPT	OPT	STD	STD	STD
Serial Copy Port	STD	STD	OPT	STD	OPT	NO	STD	STD
Hold Screen	STD	NO	NO	NO	STD	NO	NO	NO
Detachable Keyboard	STD	NO	NO	NO	NO	NO	NO	NO
Solid State Keyboard	STD	NO	NO	NO	NO	NO	STD	STD
Typematic Keys	STD	STD	STD	NO	NO	NO	STD	STD
Cursor Addressing	STD	STD	STD	STD	STD	STD	STD	STD
Read Cursor Address	STD	STD	STD	NO	NO	NO	NO	STD
Cursor Control Keys	STD	NO	STD	NO	STD	NO	NO	STD
Secondary Channel	STD	NO	NO	STD	NO	STD	NO	NO
Self Test	STD	NO	STD	NO	NO	NO	NO	STD
Baud Rate to 19,200	STD	STD	NO	STD	NO	NO	NO	NO
Smooth Scroll	STD	NO	NO	NO	NO	NO	NO	NO
Microprocessor	STD	STD	STD	NO	STD	NO	STD	STD
Tilt Screen	STD	NO	NO	NO	NO	NO	NO	NO
Switchable Emulations	STD	NO	NO	NO	NO	NO	NO	NO

The new VISUAL 200 obsoletes competitive terminals without obsoleting the software.



VISUAL See for yourself

Visual Technology Incorporated
Railroad Avenue, Dundee Park, Andover, MA 01810
Telephone (617) 475-8065 Telex 951-539

COMTEN users

- Assistance With Special Projects
- Conversions to Level 61/62
- ON-SITE Classes
- Assistance with MAF

TLC
1605 Main St.; Suite 810
Sarasota, FL 33577
(813) 365-1822

Printer, Disk Drives Among Additions To MDS Series 21

PARSIPPANY, N.J. — Mohawk Data Sciences Corp. (MDS) has unveiled four enhancements to its Series 21 line of distributed processing systems.

The first is a family of fixed/removable disk drives ranging in capacity from 26M- to 78M bytes. The drives combine both fixed platters and a removable platter on a single spindle, the vendor claimed.

The following configurations are available for the Series 21, System 2150: Model 2175-1 with 13M bytes fixed and 13M bytes removable, Model 2175-2 with 39M bytes fixed and 13M bytes removable and Model 2175-3 with 65M bytes fixed and 13M bytes removable.

Series 21, System 21/40 will support the 13M byte fixed and 13M byte removable drive, a spokesman said.

Purchase prices for the three models are $14,720, $21,680 and $28,680, respectively. Twelve-month rental prices are $368, $542 and $717 per month, respectively.

Station Printer

The Model 2141-I station printer is the second enhancement and can be located with a display station up to 2,000 ft from the controller.

Four printers, each associated with its own display station, can be supported by a single System 21/50, in addition to the system printer, for a total of five.

The product is priced at $4,960 or $125 per month. A prerequisite station printer controller, Feature 192, costs $800 for purchase or $20 per month, rental

The third enhancement is the availability of Cobol on the MDS Series 21 line, where it joins Mohawk Business Oriented Language (Mobol). As a complement to Mobol, MDS Cobol facilitates batch processing, report editing and general output data manipulation.

The license fee for Cobol is $2,500 or $65 monthly, with an initial installation charge of $200 per system. Cobol maintenance and update has a monthly charge of $20 per system.

Enhancement four is Extended Data Entry (EDE), which provides Series 21 users with the ability to utilize disk storage in their data entry operation.

The EDE program provides a range of functions and capabilities that allow users to adapt this standard software package to their unique requirements, the vendor claimed.

EDE is an optional, no charge software package with the Series 21.

Mohawk Data Sciences is located at 7 Century Drive, Parsippany, N.J. 07054.





Tod Wing Jr., treasurer of R.B. Wing & Son, a family-owned distributor of construction and industrial supplies, guided his small firm through the conversion process.

Five-Generation Family Business Takes Plunge Into DP — Slowly

Special to CW

ALBANY, N.Y. — How does a small company with no DP experience take the plunge into an interactive computer system? In many cases, one step at a time.

R.B. Wing and Son Corp. is a five-generation family business here that deals in the distribution of industrial supplies and construction equipment. The company serves more than 2,000 customers from warehouse locations in Albany and Rensselaer, N.Y.

Until recently the firm processed accounts receivable and payroll on an electromechanical bookkeeping machine with magnetic stripe ledger cards. The company now uses a Digital Equipment Corp. Datasystem 356, but got its first exposure to computing by initially using a remote workstation tied into a turnkey vendor's DEC computer.

Unlike some turnkey vendors, Concept IV Computer Systems, Inc. in West Albany — the company that supplied Wing's system — lets many of its future systems customers use a DEC computer and telecommunications to learn the DP ropes. In Wing's case, Concept IV trained the firm's staff in the computer's operation and allowed managers there to evaluate the hardware and software before making a major investment.

Two Choices

The family-owned company began looking at alternative accounting methods in 1977. The firm's investigation became more intense when the bookkeeping machine's manufacturer announced that the unit's maintenance service would end in January 1980. Faced with a deadline to replace the equipment, Wing's management had two basic alternatives: purchase a new bookkeeping machine to use as a one-on-one replacement, or take the major step of acquiring a computer system. After examining the alternatives, the company chose the computer route.

"A computer offered much greater capability in terms of the relative investments. For instance, with a computer we could establish the long-range objective of controlling our large inventory," Tod Wing Jr., treasurer, explained.

However, the basically unautomated company faced some tough hurdles with its deci-

(Continued on Page 88)

Entry-Level System Joins DG Synergists

WESTBORO, Mass. — An entry-level version of data General Corp.'s Synergist line of business systems has been announced by the company.

The Synergist M1000 was designed for such business applications as order entry, warehouse management, business accounting and financial management, according to the vendor.

The M1000 models 10, 15 and 30 are said to support up to four Dasher display terminals, up to 52.4M bytes of on-line data storage and several printer and communications options.

Based on a 64K-byte Micronova processor, all three models run interactive Synergist Basic under DG subsidiary Digital Computer Controls, Inc.'s Extended Operating System (EOS).

Synergist Basic reportedly features a direct

(Continued on Page 88)

THE RIGHT COUPON TO CLIP FOR THE SMARTEST CHOICE IN TERMINALS.

Our GT-400 is General Terminal Corporation's most highly advanced data display terminal. It's Z-80 based and uses ANSI 3.64 standard, as well as being EIA RS-232C compatible. Features include block or character mode, reverse video field, 8 user-programmable function keys and switch-selectable transmission speeds from 50 to 19200 bps.

For more information, send this coupon to GTC, 14831 Franklin Avenue, Tustin, CA 92680. Or call toll-free. In California: 800-432-7006. Elsewhere in the U.S.: 800-854-6781. Ask for Sharon Mills. In Canada, contact Lanpar Limited, 85 Torbay Road, Markham, Ontario, L3R 1G7. 416-495-9123.



Name

Title

Company

Address

City State Zip

General Terminal Corporation
The right button to push.™

GTC®



The System 8020

Handles 256 Users

Multiuser System Based on Z80

MOUNTAIN VIEW, Calif. — Echo Communications Corp. has introduced a multiuser computer system that can reportedly be expanded to handle up to 256 independent users without significantly impacting the system's throughput.

The basic System 8020 features three microprocessor modules, four independent user terminals, 20M bytes of disk storage, an 8-in. floppy disk drive and a cartridge tape backup. The unit is based on the Z80 microprocessor which is said to have a throughput clock rate of six MHz.

The system handles up to 256 users by distributing independent microprocessor modules throughout the system to maintain an even balance of power, a spokesman claimed.

One processor module handles the system mass storage functions while pairs of processor modules perform terminal and general computing functions for groups of four users, the spokesman explained.

The user terminals feature a detached keyboard and 15-in. CRT screen containing more than 3,000 software-definable characters and graphics, the spokesman explained. The system is expanded by adding more processor modules.

The basic System 8020 costs $60,000 from the firm at 1708 Stierlin Road, Mountain View, Calif. 94043.

DG 132-Column Display Gives 79% More Screen Area

WESTBORO, Mass. — Data General Corp. has unveiled a 132-column large screen display that reportedly provides 79% more active screen area than standard 80-column displays.

The Model 5210 was designed for DP and text editing applications. It can also be used for communications applications, the vendor said.

Screen Dimensions

The 15-in. diagonal screen displays 33 lines of 132-column text, or 4,356 characters. This represents a full-width, half-page in length of line printer output.

An optional screen buffer memory stores an extra 33 lines of text, or a full page, and also provides up and down scrolling.

Full-size 5 by 8 dot matrix characters combined with the 15-in. green-phosphor screen provide enhanced display reading, and the product has 96 upper- and lowercase Ascii characters plus 32 special graphics characters, the vendor claimed.

The 5210 sells for $4,500, a spokesman said from Rt. 9, Westboro, Mass. 01581.

LSI-11 Users Get Tape Controller

TUSTIN, Calif. — The Western Peripherals Division of Wespercorp has unveiled a single-board tape controller for Digital Equipment Corp. LSI-11 microprocessors.

The TC-151 universal magnetic tape controller provides 9-track NRZ format on a single quad board, according to the vendor.

PE or dual density is available by addition of a two-slot board; boards fit into a standard Q-bus, a spokesman explained.

The product can mix 9-track NRZ, PE or dual-density tape units in any combination of up to eight units, a spokesman said.

A 33-word buffer is included for greater flexibility in assigning priorities to the computer.

With NRZ only, the product is priced at $2,450; with PE and NRZ, $3,150, the vendor said from 14321 Myford Road, Tustin, Calif. 92680.

Correction

California Computer Systems, Inc. was mistakenly called "Calcomp" in a headline on Page 68 of the Sept. 22 issue. Calcomp refers to California Computer Products, Inc. California Computer Systems is at 250 Caribbean Drive, Sunnyvale, Calif. 94086.



As the world's largest publisher of computer-related newspapers and magazines, we own or provide US representation to leading local computer publications in the major computer markets of the world — those that account for the vast majority of all computers in use today (measured by value). These countries import well over $2 billion a year in US-made computer products and services, according to Commerce Department figures. And our sister publications around the world can put you in touch with the people who make the buying decisions on these imports.

The areas in which we publish or co-publish are:
Australasia
W. Germany
The People's Republic of China
United Kingdom
Japan
Brazil
Mexico

We provide US advertising representation and editorial services to publications in the following countries:
Italy
France
Greece
Holland
Sweden
Argentina
Chile
Southeast Asia

Our International Marketing Services Department can give you one-stop advertising service for any or all of these publications — including translation and production services. We'll even bill you in dollars, so it's as easy as advertising in US publications.

In addition, we can help you with market facts, and, in the case of Europe, special company awareness studies. Just indicate your interest on the coupon and send it in. Or call Diana La Muraglia at (617) 879-0700.

TO Diana La Muraglia
Manager Of International Marketing Services
CW Communications, Inc.
375 Cochituate Road, Framingham, MA 01701
(617) 879-0700

Please send me rate cards and information on publications in the following countries

☐ I am interested in more details on your European company awareness studies.
☐ I am interested in more details on your China Trade Missions.

Name_____
Title_____
Company_____
Address_____
City_____ State_____ Zip_____

CW COMMUNICATIONS/INC.
375 Cochituate Road, Framingham, MA 01701
(617) 879-0700



PUT INFONET ANYWHERE. ASK IT ANYTHING. AND THE ANSWER WILL APPEAR BEFORE YOUR VERY EYES.

INFONET is Computer Sciences Corporation's worldwide remote computing network. But it functions more like the fabled crystal ball.

Unlike systems patched together from existing parts, INFONET's design started with the ultimate task it was to perform. And then CSC created it from that architectural plan, choosing each component and building every link with only one criterion, optimum performance.

As a result, it's the most completely integrated system anywhere. Internal data exchange is far simpler and it is a substantially better base to assimilate technical advances.

For just a moment, imagine the possibilities of going back in time with all of modern science at your command. INFONET provides that kind of opportunity. Because INFONET can deliver the entire menu of computer technology to almost any chosen place. It gives the marketing man or woman a chance to take to the hinterlands of information management every solution modern data processing has to offer.

To the computer professional, INFONET also promises an endless calendar of solving new and different problems. And it offers the computer scientist a chance to play a meaningful role in the evolution of advanced data management structures. INFONET is distributed data processing on the grand scale. A true microcosm of computer technology itself.

While INFONET is only one division of CSC, it's a prime example of how we integrate software, communications and hardware to advance the techniques of problem solving.

CSC is continuously developing the capacity of history's most profound tool, the computer, to change man's relationship with everything he has ever known.

It's the ultimate challenge. Maybe you'd like to help us. If you think you're good, and you're not afraid to find out how good you really are, you should be in touch with CSC.

The only limitations are the ones you bring with you.

CSC

COMPUTER SCIENCES CORPORATION

Corporate Offices: 650 N. Sepulveda, El Segundo, CA 90245
6565 Arlington Blvd., Falls Church, VA 22046
An Equal Opportunity Employer.

System/34 Gets Letter-Quality Printer

TUSTIN, Calif. — General Business Technology, Inc. has announced a letter-quality printer for IBM System/34 that is compatible with the 5250 information display system.

The GBT 5200WP consists of a Nippon Electric Co. Spinwriter printer and a GBT controller. It accepts single or multipart forms and operates at 55 char./sec with a 96-character set, the vendor said.

The GBT controller also provides compatibility with IBM 5256 printer software.

The unit costs $7,000, from the vendor at Suite A, 2630 Walnut Ave., Tustin, Calif. 92680.

Phased Conversion Succeeds

(Continued from Page 85)
sion to install a computer. First of all, Wing's managers had very little knowledge of computers, but had heard a lot of problem-strewn horror stories of unsuccessful systems.

The company also was not sure what size machine to buy or what other resources might be needed. Finally, with more than 2,00 steady customers to serve, the possibility of a disruption because of the automated switch was frightening.

After considering a number of computer vendors, who put more emphasis on hardware than on a total approach, Wing discovered Concept IV and its phased implementation plan.

The turnkey vendor proposed a plan for the interim installation of a remote workstation at Wing's to do its processing. The company would accomplish its order entry, inventory control and accounts receivable on a DEC system similar to the one it would eventually buy via telecommunications.

The last step of phased implementation is the purchase of the computer system.

While using the terminal-accessed system, Wing employees learned how to operate the computer and a lot of the program conversion bugs were worked out before the final system was installed.

Software programs were tailored for Wing's requirements and all of the customer master files were keypunched.

"When we actually converted to the new system, we had the confidence to go ahead without any parallel processing on the old equipment," Wing pointed out.

The industrial and construction equipment distributor's Decsystem 356 computer was delivered and switched on several weeks ago.

One of the problems ironed out during Wing's terminal-oriented introduction to the DEC computer was becoming operationally proficient and developing an adequate response to process up to 150 orders a day, Wing stated.

However, on the average, the company was never more than a few days behind. When the company's system was delivered it was simply a matter of transferring files and programs.

As for expansion, R.B. Wing and Sons plans to add three more CRT terminals and a faster printer. The company will also add accounts payable and general ledger to its software repertoire.



DG Expands Synergists

(Continued from Page 85)
execution (calculator) mode, facilities for handling strings, matrices and interactive program editing and debugging.

Language Extensions

Language extensions include extended precision arithmetic, Print Using, chaining, error branching and special functions.

The language also implements sequential, relative and indexed sequential (Isam) data access methods.

Synergist Business Systems are sold through the DG General Distribution Division's independent sales organization, which can change or enhance application software to meet the individual users needs and provide training.

Synergist M1000 systems range in price from $10,950 to $25,000 from the firm at Rt. 9, Westboro, Mass. 01581.

HP has an answer for companies that are waiting for things to get better.

Our new HP 3000-III price makes it easier for you to increase productivity right now-when you really need to.

You don't have to wait. Our HP 3000-Series III can help make things better for your business now. Because we've built so many capabilities into the computer, your EDP people will be able to get the work done quicker and more efficiently. And our new price of $92,000—a $15,330 reduction—means you'll start saving from the day you buy one.

What's more, to help you get the most from your system, we'll include a free COBOL II software package—normally priced at $3000—if you buy your HP 3000 before November 1.

We're also offering a special introductory price of $5000 on our text and document processing software package, TDP/3000. And we've reduced the price of the HP 3000 graphics workstation by 14% to $14,900.



$92,000
Formerly $107,330



Our HP 250 can make a big difference to your productivity, too. Either as a remote workstation for your HP 3000 distributed system or as a stand-alone.

Buy an HP 3000-III and save 30% on an HP 250 system.

If you buy an HP 3000 before November 1, you can get an HP 250 with a 12MB Winchester disc for $15,333. That's a $7600 savings on one of the world's most advanced small business computers.

So stop waiting for things to get better and start making them better. With an HP 3000 computer. To order, contact your nearest Hewlett-Packard sales office listed in the White Pages.

HEWLETT PACKARD

All prices are U.S. domestic. TDP/3000, graphics workstation, COBOL II and HP 250 offers expire October 31.

47004HPG68

Memories are made of this...



TELERAY
DIVISION OF RESEARCH INC
Teleray Response Line 800-328-6179

Based on Eclipse

Manufacturing Turnkey Debuts

HAMDEN, Conn. — A Data General Corp. Eclipse-based manufacturing and distribution system that includes programs for sales, order processing, invoicing, sales analysis, product inventory, purchasing and accounts receivable is available from Computeristics, Inc.

The turnkey system, known as Custom Control, features on-line, real-time order entry, on-line credit checking, multiple warehouse inventory control, on-line inquiry of inventory and customer records, automatic processing of back orders, invoicing of all orders shipped, audit trails and data security.

Each of the system's integrated manufacturing and distribution modules can be implemented selectively as the user requires, the vendor claimed, adding that extensive reporting capabilities are available with each of the modules.

The price for Custom Control ranges between $125,000 and $500,000 depending on hardware configuration, the vendor said from 2 Skif St., Hamden, Conn. 06154.

Basic Four CPUs Get Test Box

KING OF PRUSSIA, Pa. — A microdiagnostic test device called Uptime has been developed by Sorbus, Inc. to detect and isolate malfunctions in Basic Four Corp. 400, 600, 200, 410 and 610 processors.

Once installed, the test equipment enables a computer operator to make a preliminary diagnosis of the problem in two or three minutes, according to Sorbus.

The printout from the diagnostic device will tell the operator in English whether it is a hardware malfunction or some other type, where the problem is located and the type of service required, the vendor said.

Uptime is included with the maintenance cost, which can range between $175 and $750 monthly depending on the system configuration.

Sorbus can be reached at P.O. Box 428, 150 Allendale Road, King of Prussia, Pa. 19406.

Dual-Sided Minifloppy Boosts Micro Storage

WALTHAM, Mass. — Dennison Kybe Corp. has unveiled a dual-sided minifloppy diskette said to provide twice the storage of conventional disks for users of Radio Shack Corp. TRS-80, Apple Computer, Inc. Apple and other microcomputers.

The main feature of the 5.25-in. diskette is that it allows users to record on both the front and the reverse side, the first time such a feature is offered in a mini format, a Kybe spokesman claimed. The disk contains two recording surfaces as well as two sets of write enable and index holes.

Rated for more than 12 million successful passes, the disks cost $5.95 each from the firm at 132 Calvary St., Waltham, Mass. 02154.

Single-User Micro Updated

OAKLAND, Calif. — A Z80A-based single-user system has been announced by Digital Microsystems, Inc.

A direct replacement for the firm's DSC-2 single-user system, the DCS-3 is said to offer technical and engineering improvements, including expandability to multiuser and network systems.

The basic DSC-3 includes a processor with 64K bytes of memory, four RS-232 serial I/O ports, two 8-bit parallel I/O ports, selectable single-density IBM 3740 or double-density System/34 disk formatting, bootstrap and diagnostic read-only memory, real-time clock and two 8-in. floppy disk drives.

The price of $5,495 includes Digital Research, Inc.'s CP/M operating system. Oasis is also available from the firm at 4448 Piedmont Ave., Oakland, Calif. 94611.

Digital's Cure for the Recession Blues.



Factory-refurbished and fully warranted components for PDP-8 and PDP-11 systems. All priced substantially below original list.

Take your pick. CPUs: 11/03-KA, 11/03-JA, DS310-HA; Communications: DL11-A, DMC11-AL, DZ11-C, DUP11-DA, KMC11-A; Memory: MSV11-CD, MM11-L, MS11-AP, MS11-CC; Mass Storage: RK05J-AA, RK05F-AA/FA, RP03-AS, RP11-EA, TA11-AA, TU10-EE, RP11-EB; Terminals: LA180-PA, LA180-PD, LT33-DC, LA36-CE, VT50-AA; Miscellaneous: AR11, AR11-KT, KK11-A, KY11-LA, KE11-B, KW11-L, PC11-A, CM8-FB, CM11-FA, PR8-E, VC8-E.

Do your pocketbook a favor. Look into these money-saving values today. For pricing and delivery details, call 800-258-1728 toll-free, 8 to 5 ET (in New Hampshire, Alaska and Hawaii, call 603-884-7240).

Digital Equipment Corporation
522 Amherst Street
Nashua, NH 03063

digital
We change the way the world thinks.



'I'd Like to Introduce You to Our New DP Manager. The Man Is Dynamite!'

Ti-Mix Seeks Presentations

AUSTIN, Texas — Texas Instruments, Inc. Minicomputer Information Exchange (Ti-Mix) has issued a call for presentations for its TI equipment users conference to be held in New Orleans, March 8-11.

Thirty-six sessions — consisting of individual presentations, panel discussions and workshops — are planned. Presentation abstracts are being solicited until Nov. 1.

The conference will feature two exhibit rooms — one for TI equipment and one for Ti-Mix member exhibits.

The event's guest speaker will be Daniel D. McCracken, author, consultant and past president of the Association for Computing Machinery. More information is available from Ti-Mix, M/S 2200, P.O. Box 2909, Austin, Texas 78769.

Univac Offers Printers for V77s

IRVINE, Calif. — Three line printers that reportedly deliver increased output at a price 11% below that of previous models were introduced today by Univac's Mini-Computer Operations (MCO).

Designated the Model 0789 printer series, the line printers for the V77 family of minicomputers are available in three different print speeds — 180-, 300- and 640 line/min, compared with 300- and 600 line/min for previous printers.

The three latest printers offer operator-selectable print spacing of 6- or 8 line/in. and up to 132 print positions.

All three printers use a flexible etched steel band which is available in several languages, including English, Finnic, Spanish and Katakana.

Various character sets ranging from 48 to 192 characters are available on the print bands. The bands are interchangeable among the printers.

The 180 line/min printer can be upgraded in the field to 300 line/min for those customers whose needs expand beyond original system requirements, Univac noted.

Prices, including controller, are $10,584 for the 180 line/min printer, $12,500 for 300 line/min model and $15,650 for the 640 line/min unit. They will be available in the fourth quarter.

Controller Ties Floppy, Multibus

CHAMPAIGN, Ill. — A double-density floppy disk controller that allows the user to hook from one to four double-density standard size floppy disk drives to an Intel Corp. Multibus system has been introduced by Central Data Corp.

The board uses the industry standard FD1791 controller and is adaptable to single and double-sided drives. All write data is precompensated for reliability, according to the firm. All data transfers to and from memory are done by DMA and logic is included for full multimaster capabilities.

The controller costs $415 from Central Data at 713 Edgebrook Drive, Champaign, Ill. 61820.

Subsystem Gives Disk Backup

WILSONVILLE, Ore. — Architape, a 14M-byte cartridge tape subsystem providing disk backup and file transport for Perkin-Elmer Corp. minicomputers and Tektronix, Inc.'s 4081, is being offered by Scientific Enterprises, Inc.

The Z80-based, half-card controller is compatible with MUX and Selch buses. Read-while-writing capability using CRC error-checking guarantees data integrity, the vendor claimed.

The product comes with software that performs "wild card" file save and restore and costs $4,800, the vendor said from 9375 S.W. Commerce Circle, Wilsonville, Ore. 97070.

Pilgrim Power Center Guards Minis, Micros

PLAINVIEW, N.Y. — An ac power conditioner/distribution center from Pilgrim Electric Co. is said to protect minicomputers and microcomputers from induced lightning effects, inductive load-switching transients, ac power line Radio Frequency Interference (RFI) and electro-magnetic interference (EMI).

The Voltector Series 7 includes a 15A- rated, bidirectional Comtrans filter, circuit breaker on/off switch, elapsed time meter and eight, 10 or 12 independently RFI isolated ac receptacles.

For eight outlets, the model R150-8 costs $448; the R150-10 costs $475; and the R150-12 costs $497 from the firm at 29 Cain Drive, Plainview, N.Y. 11803.

HD-11 Gets Option

NATICK, Mass. — Charles River Data Systems, Inc. is offering a 17M-byte cartridge tape backup option for its 20.8M-byte HD-11 Winchester-type disk drives.

The tape option reportedly allows the user to back up Winchester disk drives and transfer software between systems.

The tape backup option costs $2,200 or $8,700 with the HD-11 disk drive, the vendor said from 4 Tech Circle, Natick, Mass. 01760.



You don't have to commit 'til we've lived together 90 days.

Only GTC promises so much. The industry's first 90 day guarantee. It means you can tie the knot with any GTC display terminal, and if you don't experience perfect bliss during the first three months of your working relationship, you can call the whole thing off. We'll take the terminals back. You'll get your money back.

All we ask is that you treat our terminals with respect, honor our standard purchase agreement terms, and take responsibility for freight charges.

But obviously we aren't worried about unrequited love. We wouldn't commit to the best guarantee in the business if we couldn't put you together with the best terminals in the business, from our teletype-compatible models to our interface-compatible models.



And to make our togetherness even cozier, we've coupled our 90 day guarantee to our standard 6-month warranty. Nobody can offer you a bond as strong as that, for love or money.

So take us on for 90 days. We may have the first honeymoon that never ends.

General Terminal Corporation
The right button to push.™

GTC

For more information on GTC products and services, call toll-free today. In California: 800-432-7006. Anywhere else in the United States: 800-854-6781. Ask for Mary Hart. Or write Mary Hart at General Terminal Corporation, 14831 Franklin Avenue, Tustin, CA 92680. Telex: 910-595-2428. We have offices throughout the world. In Canada, contact Lanpar Ltd., 85 Torbay Road, Markham, Ontario, L3R 1G7. Phone: 416-495-9123. For a free reprint of this ad please write the GTC marketing department.

Find out about information management systems, data transmission networks, telecommunications, real-time systems, computer system reliability, executive stress and much more—in Computerworld Books.

And the best part is—there's no risk! Your money back if not satisfied.

HP233
Programming Real-Time Computer Systems
James Martin



This volume explains real-time systems from the points of view of management, systems analysis, programming, and sales. The book discusses design, programming, testing, and implementation of real-time systems. In defining "real-time," Martin goes beyond a mere discussion of a real-time computer's essential characteristic (i.e., direct and immediate response to rapidly changing situations). Program testing and system build-up, which are particularly difficult on real-time systems, are discussed in detail. **$21.95**

HP236
Systems Analysis for Data Transmission
James Martin



The most comprehensive and up-to-date treatment of the design and analysis of data transmission systems. This indispensable handbook is in six sections: System Considerations, User Considerations, Terminal Considerations, Network Considerations, Software Considerations and Design Calculations. The last section occupies more than half the book and contains many worked examples. Many organizations with data transmission networks could halve their cost if all of the design alternatives were considered and appropriate computations were performed to select the best. With this in mind, the book lists the alternatives and provides programmed algorithms for comparing them and for optimizing network layouts. **$59.95**

HP237
Introduction to Teleprocessing
James Martin



This volume presents an introduction to teleprocessing which is both comprehensive and enjoyable to read. The book discusses data transmission and how it is used. It explains the nature of the communication links and the hardware that is attached to them. It describes the codes, modems, terminals and methods of line organization. It explains the need for multiplexing and the types of network structures that are used. Software is explained, and the design techniques needed to implement the system are discussed. **$21.95**

HP238
Future Developments in Telecommunications, 2nd Ed.
James Martin



Few fields offer such spectacular business opportunities as the new telecommunicataions environment with its recent change in political constraints. It is vital that all corporate planning is done with an understanding of the new communications resources. This volume is written for the layperson as well as the technical reader. The book will be studied closely by computer and telecommunications persons but it is perhaps more important that what it has to say is understood by sociologists, businesspersons, corporate strategists, politicians and all thinking people. **$34.95**

HP232
Programming Assembler Language
Peter Abel



This book is a concise, detailed analysis of ASSEMBLER, the efficient language that provides an alternative to languages like COBOL or PL/1. Each chapter covers a separate area of ASSEMBLER and includes sample programs, end-of-chapter exercises, and debugging tips to help newcomers to ASSEMBLER develop effective programming strategy. **$16.95**

HP212
Computer Systems Performance Evaluations
Domenico Ferrari

Covers every major computer systems measurement technique for a more assured, practical approach to all your evaluations! Improve your expertise in measurement, simulation, analytic modeling, selection, improvement, design, and numerous other essential methodologies. Dozens of illustrations, tables and charts guide you to better results. **$31.95**

BP222
Management Information Systems
George K. Chacko

This book offers a unified treatment of the use of data to influence prespecified outcomes in the behavior of entities in the public as well as private sectors. Dr. Chacko, one of the great authorities in the field of management information systems, avoids the indiscriminate automating of data processing in the name of "information" and stresses evaluation by management based on the insights that are generated. **$27.00**

HP239
Communications Satellite Systems
James Martin



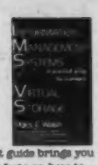
The potential of satellite communications is so great that it can change the entire fabric of society. As petroleum costs rise, large-screen tele-conferencing, interactive education, and new electronic networks will change working and living patterns. Communications satellite technology is often misunderstood. In some ways it is fundamentally different to terrestrial telecommunications. This book attempts to explain the subject, the tradeoffs, and the implications for system design. It is desirable that there should be widespread comprehension of what large satellites could do, so that corporations, the public, and the economy are not robbed of the immense benefits. **$37.50**

BP223
Computer Optimization Techniques
William Conley



This book takes a greatly simplified approach to optimization problems and thus lets the computer produce the solution with ease. Computers have become so fast and computer time so inexpensive that it is now possible to state an optimization problem—whether linear or nonlinear—as a highly accurate reflection of reality, then let the computer search all the possible solutions and produce the optimum regardless of the functional form of the problem. This book demonstrates that a nearly optimal solution will be produced for practical problems that necessitate a random search. **$25.00**

HP231
Information Management Systems/Virtual Storage
Myles E. Walsh



This practical new DP management guide brings you straight talk on IMS/VS, with hard facts on how to plan, implement, and manage this technologically exciting data base management system. See how to establish a DBMS, get it operational, plan staffing and education, and much more! **$16.95**

WJ226
The Viewdata Revolution
Sam Fedida and Rex Malik



The Viewdata revolution will change radically the dissemination of information in society and will affect the development of a wide range of business, especially but not exclusively, in the information and communications industries. The authors examine the Viewdata technology, explain what Viewdata is and how it works and they consider the impact of this revolutionary new system on the individual and society. **$34.95**

ET229
Ethnotechnical Review Handbook
Daniel P. Freedman and Gerald M. Weinberg

This book describes the "hows" and "whys" for performing formal technical reviews of systems and procedures and their related documentation. The text is directed at system developers and maintainers who are familiar with structured development approaches, walk-throughs, meeting facilitation techniques, and objective problem solving techniques. The contents are organized into five major sections, with a short annotated bibliography and comprehensive index. **$56.00**

WJ241
Computer System Reliability
Roy Longbottom



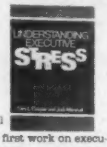
This book explains the practical aspects of reliability, availability, serviceability, and maintainability of computer systems for all those interested in the design, manufacture, maintenance, or use of computers. Numerous examples are given based on reliability and down time as seen by the end user. Areas covered include mainframes, mini-computers, microprocessors, peripheral equipment, communications sub-systems, and software. **$31.95**

BP224
Management Fraud: Deterents & Detection
Robert K. Elliott and John Willingham



The authors define fraud by classes of perpetrators, by classes of victims and means of perpetration. They discuss the role in detecting fraud and their responsibilities to the public and various government agencies. Also included are viewpoints by various experts such as Myron Uretsky, David R. Saunders, Martin M. Greller, James E. Sorensen and Thomas L. Sorensen, on aspects of auditor's control, deterrents and detection of management fraud. **$28.00**

BP227
Understanding Executive Stress
Gary L. Cooper and Judi Marshall



This pacesetting new book is the first work on executive stress to be based on research with executives and their spouses. The authors discuss the need of some executives for certain amounts of stress, stress from the job environment and from within executives themselves, the beneficial and destructive effects of stress. Three broad strategies are proposed to help individuals and organizations cope with stress and special emphasis is placed on the role adopted by the executive's spouse. **$14.00**

HP216
Successful Data Processing System Analysis
Thomas Gildersleeve

Here's a convenient one-stop reference helping you through every major area where smooth-operating management and consulting is essential. Included in this volume are cost benefit analysis, development of functional specifications, creative thinking, data collection, communication, and much more. You'll see how to determine how well the functions in your system are presently being performed. Plus, you'll get scores of real-life models, practical guidelines, checklists and on-target pointers. **$15.95**

MAIL THIS NO-RISK ORDER FORM TODAY!

Mail to: **Computerworld Books,** 925 North Milwaukee Ave., Wheeling, IL 60090

Please send me the following book(s):

Code	Quantity	Title	Total Price

Add $1.25 shipping and handling for one book and 75¢ for each additional book. If your check is enclosed, we pay shipping cost. _____

Total cost (Illinois residents add appropriate sales tax) _____

15-Day Free Trial! I may read the books for 15 days, and, if not satisfied, return them, and you will refund my money.

☐ Check enclosed ☐ BA/Visa ☐ MC (MC only—List four digits above your name)

If a charge, we need your signature _____ Expiration Date _____

☐ Bill my company (Purchase order enclosed)
☐ Bill me (include company name)
OVERSEAS ORDERS: Add $8.00/book for Special Handling Air Mail Delivery. Payment in equivalent U.S. dollars must accompany overseas orders.

Name _____

Firm _____

Address _____

City _____ State _____ Zip _____

Computerworld Books CM10060

U.S. Exports Aiding, Abetting Soviet Military?

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Because sophisticated Western electronics technology shows up in commercial, exportable products long before it does in weapons systems, the Soviet military may be obtaining and applying the technology faster than the U.S. military, according to a Texas Instruments, Inc. executive.

As a result, Charles H. Phipps recently told a Senate committee, the Soviet Union can, through imports, compensate for an electronics industry several years behind that of the U.S., and the two countries could end up deploying weapons of equal sophistication.

Testifying late last month on legislation to restructure U.S. export administration, Phipps, TI assistant vice-president and manager of strategic development, said there has been "a marked shift" in initial application of electronics resulting in commercial uses preceding military applications by as many as seven to 10 years.

"Because of this shift in the driving force behind technological innovation," Phipps said, "militarily critical technologies for future military systems are now making their way to potential adversaries through commercial trade."

He asserted the present U.S. export control system is not well-equipped to tackle this problem but stopped short of endorsing legislation, sponsored by Sen. Jake

(Continued on Page 94)

IBM Tightens Squeeze on 3033 Exporters

By Marcia Blumenthal
CW Staff

U.S. third-party vendors exporting IBM 3033 systems were virtually shut out of this limited but lucrative trade venture last week.

IBM began putting the pincers on the brisk export market last July, when it informed customers that when they chose to "initially install a machine in a country other than the country of delivery and purchase such a transaction may be subject to an Installation and Warranty service charge." The charges were waived for users signing purchase agreements prior to June 30 for equipment shipped no later than Sept. 30, IBM said.

IBM generally made no distinction about the geographic origin of the products, according to several third-party vendors interviewed.

Target of Directive

While ostensibly the IBM user advisory was applicable to all IBM products, third-party vendors agreed that the directive was really aimed at the 3033 system. It is really the only profitable system to export, said George H. Heilborn, president of IPS Computer Marketing Corp.

Although a relatively small number of third-party vendors were involved in exporting, one executive estimated nearly 50% of the 3033s installed in Europe were imported. As of last month, a total of 430 of these systems had been installed outside of the U.S., International Data Corp. said.

IBM said the growing volume of these transactions subjects the firm to significant additional costs in providing such services and in planning for production and the level of support services.

IBM's move is a reaction to the fact that non-U.S. production levels for the 30 series are not being met, Kenneth Pontikes, president of Comdisco, Inc., noted.

With the continuing deflation of the U.S. dollar in Europe in recent months, the savings between a 3033 bought in the U.S. and one purchased in the UK, for example, could be as high as $1 million, one vendor noted. Generally U.S. prices were 25% below those in Europe, another vendor estimated.

Exporting to the UK was particularly prevalent. To combat this practice, IBM UK Ltd in June announced an 11% reduction on the purchase price of Series 30 processors and memory.

Shortly thereafter, IBM advised customers that either they or the third-party exporter would have to obtain a Request for a Price Quotation (RPQ) for systems not purchased in the same country in which installed. This, however, does not apply to transferring systems within the European Economic Community.

In most cases, the RPQ resulted in a surcharge of 10% to 12%, Pontikes estimated. In addition, import duties average 7% and foreign users must adjust the system's power from 60-cycle to 50-cycle for European use.

The price reduction in the UK, the RPQ surcharge and the various duty charges have wiped out any price advantage, causing this export market to dry up, vendors agreed.

Gartner: IBM Readying Assault On Its Eroding Market Share

By John Whitmarsh
CW Staff

PHILADELPHIA — The computer industry is on the eve of the big push by IBM to reverse its eroding market share and to recapture its market position, according to Gideon Gartner, president of The Gartner Group, Inc.

All the evidence suggests that IBM will force the market share issue as early as 1981, Gartner recently told attendees at the 12th annual Society for Management Information Systems (SMIS) conference here.

IBM's strategy is multipronged, in Gartner's opinion, and will include the long-awaited introduction of the H series at the high end supported by a powerful showing in low-end small business computers.

"This will have startling ramifications for the industry," according to the IBM watcher.

Here is Gartner's evidence of the lull before the storm:

Trading of IBM securities has been subdued. "IBM stock has been static over the past four years, while the competition has been very active," the analyst noted.

At $65 per share, the price of IBM stock is $10 below the selling price of 12 years ago,

(Continued on Page 94)

BDS

Line Printers for End Users and System Integrators Improves Profit*



* Volume discounts
* Dataproducts Technology
* 30-50% savings
* 125-1800 LPM
* 30-day delivery
* Nationwide service
* Over 50 Interfaces and Controllers to choose from

To: **BDS Computer Corporation**
1120 Crane Street
Menlo Park, CA 94025
(415) 326-2115
TWX 9103732005 (BDS MNPK)

The Computer System I Use_____

Name_____

Title_____

Company_____

Street_____

City_____ State_____ Zip_____

Telephone ( ) _____ Ext_____

Senate Told Exports Bolstering Soviet Military

(Continued from Page 93)

Garn (R-Utah), that would establish an independent Office of Strategic Trade to replace the Commerce Department's export administration system.

Garn introduced the legislation in late April, claiming the Commerce Department has failed to protect national security in controlling export licenses of sophisticated technology. The "export promotion bias" of the department has "overwhelmed" its national security responsibilities, according to Garn [CW, May 5].

Although the export administration system was revamped just last year with passage of the Export Administration Act of 1979, Garn claimed the system "has failed miserably" in its mandate to both promote exports and defend national security.

Administration officials at the recent hearings, including Commerce and State Department representatives, defended their export control activities and suggested the proposed bill would only add an additional layer of bureaucracy to an already complicated export licensing system.

Phipps agreed with Garn that "the United States cannot afford to continue muddling through" with its present export control policies and practices, but said the administrative problems of restructuring the system should not be underestimated.

'Militarily critical technologies for future military systems are now making their way to potential adversaries through commercial trade.'

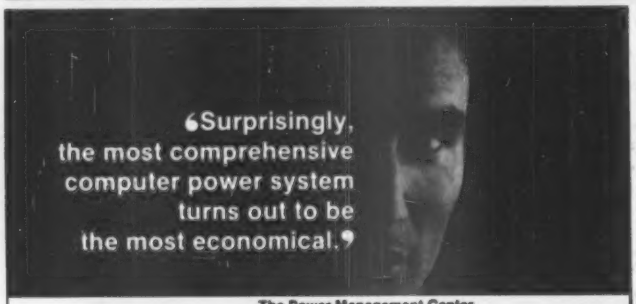
"I suspect it is more a question of will and resource dedication than structure," Phipps said. "On balance, it seems worthwhile to make one final push to get policy implemented within the existing structure. If that fails," he added, an Office of Strategic Trade would have merit."

Stressing the need for quick action to prevent leakage of sophisticated technology to the Soviet Union and its East European allies, Phipps said the number of "commercial technologies with potential military applications, or the so-called 'dual-use' technologies is increasing.

"The control of the 'dual-use' technologies is likely to be more difficult in the 1980s," according to the TI executive, who noted "semiconductor technology in particular, is the driving force for the information revolution, and it will be applied to an increasingly wider spectrum of products."

Emerging very large-scale integration technology, "if applied to Western weapons systems on a timely basis, can give the West a dramatic lead in sophisticated weapons, military communications and controls," he said.

But "if these technologies are exported to adversaries for commercial use before their military applications are operational at home," Phipps warned, "the Western alliance could soon face an enemy who possesses weapons of equal techological capability."





The Power Management Center
generates savings!

100% effective conditioning eliminates costly computer error, program damage and downtime caused by power fluctuations. Flexible plug-in distribution cables replace expensive rigid conduit electrical systems.

Installation expense is minimal and maintenance costs are practically non-existent! And, growth possibilities are unlimited!

Start saving now - call or write Conditioned Power, 1050 Dearborn Drive, P.O. Box 29186, Columbus, Ohio 43229 (614) 888-0246

Conditioned Power
subsidiary of Liebert

IBM Readying for Big Push To Regain Market Share

(Continued from Page 93)

Gartner said, but earnings per share have quadrupled in the same period. "From the Wall Street point of view, that makes IBM very elusive," Gartner said.

IBM's share of the domestic market is only 32%, according to a 1979 Gartner study. To IBM management, 31% share of market is absolutely intolerable," Gartner stated.

Comedy of Errors

IBM has suffered a "comedy of errors" in its recent product introductions. "The company could not deliver the 4331, couldn't build the System/38 and couldn't support the 8100 — all of which put great pressure on IBM revenues and earnings," according to Gartner.

User independence, stimulated by plug-compatible manufacturers, did not go unnoticed by IBM, and user independence is now a structural factor in the industry," Gideon said.

IBM has been gearing up for "a major upheaval in information systems" since the early '70s, and Gartner said the company felt it would face its biggest crisis in the early '80s. The crisis would be precipitated by the commodity-like nature of cheap hardware and the domestic and foreign competition it encourages, according to Gartner.

In addition, IBM seriously wondered if the price of technology in terms of millions of instructions per second (Mips) was not coming down too fast for the user community to absorb. IBM apparently still wonders if the market is ready for the 10- to 20-Mips H series, Gartner speculated

Behind all of these developments has loomed the federal antitrust suits against IBM. IBM signed consent decrees in 1931 and 1956; a settlement in the current antitrust suit may come in 1981, Gartner believes.

The settlements at precise 25-year increments have produced what Gartner calls "supercycles" in the computer industry.

"Forget the five- to 10-year product life cycles of the past," Gartner urged his audience. "The latest 25-year supercycle is ending, and we are about to embark on another. It's time for IBM to again change the structure of the industry."

IBM total revenues have climbed 12% per year since 1975, but the company's capital expenditures have shot up more in the same period, Gartner noted.

Conclusion: "IBM is now building capacity in anticipation of demand in order to regain market share. Once the current antitrust suit is out of the way, IBM wants to be ready with plant capacity."

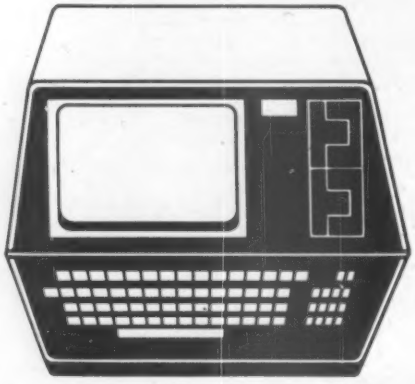
In Gartner's view, IBM will apply more muscle in small business systems.

"In small systems, IBM has come from nowhere in 1974 to an overwhelming position in 1979 with the System/38, the 8100 and new customer support centers. IBM is incredibly active in the low end, and small systems are the key to IBM's market share strategy," Gartner emphasized.

As one show of strength, IBM currently has a small systems backlog of $8 billion, more than three times the latest revenues of Digital Equipment Corp., Gartner noted. Additionally, Gartner said, IBM's small systems product line "pretty well overlaps that of DEC."

Gartner also predicted IBM will add a personal computer to its small systems line. Smaller than the IBM 5120, the new processor will be made in Japan and designed to penetrate the Apple Computer, Inc. and Radio Shack microcomputer markets, Gartner concluded.

WORD PROCESSING DISTRIBUTORS WANTED



Word Plus, a division of an international company, is now seeking distributors for the United States. Distributors must present a company profile that shows a solid financial base, marketing strength, proven knowledge in hardware and software and a competent record of service and support. Word Plus will show serious inquiries a total support package and the Word Plus Word Processing System. Send company profile to:

WORD PLUS™
The Beta Center
5151 Glenwood Avenue
Raleigh, N.C. 27622
(919) 781-7440

Taking Cue From Foreign Rivals

Long-Term Industry Strategy Prescribed for U.S.

By Jeffry Beeler
CW West Coast Bureau

SANTA CLARA, Calif. — The U.S. will have to take a cue from its overseas rivals and develop a comprehensive, long-term industrial strategy if it hopes to counter the threats of stiff foreign competition, declining productivity and growing capital-investment requirements, according to Honeywell, Inc.'s chairman Edson Spencer.

Although the U.S. hardly can be expected to emulate the national strategies of countries like Japan and France, it does need to abandon its short-sighted economic policies and adopt a long-term view toward industrial planning, Spencer said.

Speaking at a dinner meeting sponsored recently by the American Electronics Association (AEA), Spencer urged executives in the high-technology field and other industries to increase their level of involvement in the U.S.' political processes. The country can succeed in implementing a comprehensive industrial strategy — but only if business leaders take an active role in the strategy's formulation, he said.

"We have to turn government into our ally rather than our adversary," Spencer told an audience composed primarily of managers from Silicon Valley's high-technology companies

One of the main vehicles through which business can influence the course of U.S. economic policy is the so-called political action committee (PAC). "Employees at many companies can contribute to a PAC, which in turn actively supports political candidates," Spencer explained. "The AEA has a PAC, and I urge those of you who don't have your own to support it."

Spencer's comments came in an address during which he posed — and attempted to answer — the question of whether the U.S. can cure its pressing social and economic ills and remain "solid-state" as a nation.

Strong Dose of Medicine

Earlier during his talk, the Honeywell chairman took exception with the widespread view that the high-technology field needs increased government protection from foreign competition. Contrary to popular belief, overseas rivalries probably represent more of a boon to the domestic computer equipment and semiconductor trade than a hindrance, Spencer said.

"Foreign competition is like doses of medicine," he explained. "Even though it may not taste good, its long-term benefits far outweigh the initial negative response. Protection only supports our weak industries and costs American consumers in higher prices. Ultimately the inefficient producer loses out, even when protected."

The threat of strong foreign competition promises to keep the U.S.' high-technology field from succumbing to the same complacency and market myopia that have already overtaken the domestic auto industry, among others.

"We [in the computer and microelectronics field] will continue to have to take risks, invest, develop new products and remain competitive because we see great opportunities in front of us and because we know that a strong competition is hard on our heels," Spencer said.

'Foreign competition is like doses of medicine ... Even though it may not taste good, its long-term benefits far outweigh the initial negative response. Protection only supports our weak industries.'

To maintain their competitive edge in world markets, U.S. computer-equipment and semiconductor manufacturers need to overhaul fundamentally their philosophies and methods of managing people, Spencer said.

During the last few years, employees both inside and outside the electronics field have begun to demand an augmented voice in the way their companies are run. Specifically, they've begun to demand the right to play an important role in deciding, not just what products their firms will make, but also how and where those wares will be made, according to Spencer.

Executives of high-technology companies need to recognize the increased demand for participative management and modify their administrative practices to accommodate those demands, Spencer said.

"Traditional hard-driving, production-type management may not be the best answer to motivating people in the service industries and the main industries like electronics," the Honeywell executive said.

Unfortunately for the U.S., domestic high-technology firms have enjoyed much more success in advancing the technological state of the art than they have in upgrading their management practices, and the consequences of their management shortcomings are visible everywhere.

In Silicon Valley, for example, personnel turnover rates are typically very high, whereas in Japan, employees usually remain with the same company for their entire working lives, according to Spencer.

"No wonder the Japanese semiconductor industry produces such high-quality and cost-effective products," Spencer observed.

In their search for "new, more humanistic ways of managing people," domestic computer-equipment and semiconductor firms would do well to emulate the practices of Japan and other countries whose productivity rates are rising faster than the U.S.', Spencer added.

HOW TO MAKE SURE YOU NEVER BECOME OBSOLETE

A fast, furious, five-day course for Software managers, to update you well into the 80's. Taught personally by Ed Yourdon and Tom DeMarco.

You're a seasoned, top-flight Software manager, but the world you manage has changed dramatically.

The techniques are new. The people are new. They develop systems differently than you once did.

You haven't the time to go back to school to catch up. And those expensive methodologies leave you gasping to know more.

How can you update yourself completely, in the shortest possible time?

SPEND FIVE DAYS WITH YOURDON AND DEMARCO IN LOS ANGELES, DECEMBER 8 to 12

Ed Yourdon and Tom DeMarco are leading authorities on managing structured techniques. In their complete five-day course, "Strategies for Software Development," they will arm you with facts and principles that will carry you well into the 80's. They will teach you how to separate superficial change from significant change.

You'll return to your shop better able to understand the new techniques you must manage. You'll know where your projects stand and where they're going. And you'll have firmer control of any new changes that hit you.

After you finish your course, the 150-person Yourdon organization and Yourdon Press will be there to *keep* you updated, year in and year out.

Send the coupon at right or phone Yourdon toll free to sign up.

Sign me up for "Strategies for Software Development" in Los Angeles, December 8 to 12.
Send me a detailed brochure of the course.

Name

Organization Title

Address

City State Zip

Telephone

YOURDON
1133 Ave. of the Americas, New York, NY 10036
Phone (212) 730-2670

Call us toll-free at 800-223-2452
(In Canada and New York State, 212-730-2670 Collect)

Seven Out of Eight Agree

Informal Poll Finds Racism Felt by Black DPers

By Bruce Hoard
CW Staff

WASHINGTON, D.C. — Seven people out of eight at the second annual meeting of the Black Data Processing Associates agreed racism exists in the U.S. DP industry, according to a poll conducted there by *Computerworld*.

However, all eight indicated they feel DP job opportunities are abundant for blacks and seven said blacks in DP are doing at least as well as those in other vocations.

Asked whether black-owned DP businesses can compete on an equal footing with white-owned firms, their opinions were more qualified, but said they believe black businesses can compete.

As for the most desirable work locale Washington, D.C., was mentioned most frequently.

Finally, on the best and the worst companies to work for, results were mixed because pollees had ambivalent reactions to most vendor companies.

Individuals polled who were familiar with Public Law 95-507, which requires firms receiving government contracts of $1 million or more to hire minority firms as subcontractors, said that law is frequently skirted by majority companies.

'Still a Lot of Racism'

"There's still a lot of racism, by force or company policy," said Jack Bullock, AM International, Inc.'s district sales manager. "We [blacks] can get in if they have a need for us, but it depends on who you work for. The way the laws are, larger companies in areas like the Northeast Corridor provide a pretty good opportunity if you're qualified."

Like several others, Bullock agreed DP jobs for blacks are more abundant simply because the industry as a whole is growing rapidly and there are more and more government contracts to be filled.

Bullock expressed a negative opinion when asked about the chance of a black-owned DP firm competing equally with a white-owned company. "Both companies being equal in technical and managerial expertise — no," he said. "The black company can operate, but the system won't give them a break."

A former Xerox Corp. employee, Bullock said that firm was good at hiring blacks, but not at promoting them into management jobs. Of PL 95-507, he said, "A lot of companies don't realize the law is there, and a lot don't enforce it unless somebody tells them to."

Carey Moore, marketing representative for Pertec Computer Corp., was the only person who did not affirm the existence of racism in the DP industry: "My basic belief is I haven't experienced racism as such." However, "in the DP area, I do find very few blacks in my position."

Moore said black businesses can compete equally with whites, voiced no opinion on worst job areas or companies to work for, and although he was not familiar with PL 95-507, said, "The conscientious companies will comply with the law."

But Bennie McLeod, manager of data services at Lettercom, Inc., disagreed with Moore about racism: "Without a doubt, it's not a very good situation. Often people are overlooked for certain positions because it's who you know, not what you know."

(Continued on Page 98)

BDPA Meet Spotlights Minority-Owned Firms



CW Photo by B. Hoard

Newly elected officers of the BDPA are (left to right) Earl A. Pace Jr., president; Myra Anderson, corresponding secretary; Melonease Shaw-Taylor, recording secretary; Wilbur McReynolds, treasurer; and Norman R. Mays, vice-president.

By Bruce Hoard
CW Staff

WASHINGTON, D.C. — The advancement of minority-owned DP businesses and the election of national officers topped the bill at the second annual meeting of the Black Data Processing Associates (BDPA) here Sept. 20-21.

Washington, D.C., Mayor Marian Barry kicked off the meeting Saturday by telling the 50 attendees that DP "is an area that has been controlled by nonblack people. It is a field that is growing and, therefore, you have to be there. I learned a long time ago, you have to be there or decisions will be made for you."

Anthony Goode, business development specialist at the Small Business Administration (SBA), told BDPA members at the Minority Business Roundtable on Sunday that the SBA has programs to help minorities obtain federal loans, but the process is an arduous one.

Loan Program

The key to minority loans at the SBA is the "8(a) Program," an effort to promote equal access for socially and economically disadvantaged individuals to participate in the business sector of the nation's economy, he said.

"We have the largest number of 8(a) firms in the nation here in Washington, D.C.," Goode noted, adding the Carter Administration has set a goal of allocating $2 billion for 8(a) procurement.

"We are going to reach that, but I consider it a pittance compared to what companies like Chrysler have received," he said.

Boon to Business

The passage of Public Law 95-507 is a boon to minority businesses, as long as it is enforced, the business development expert commented. PL 95-507 requires majority businesses that receive government contracts in excess of $1 million to seek out minority firms to use as subcontractors.

Asked about enforcement of the law, Goode replied, "It's something we have to look at very closely because we know it will be used against us. You must realize we still live in a racist society."

In an effort to make sure the law is complied with, "small and disadvantaged advisers" are at all federal agencies monitoring $1 million contracts, he said.

Another aid to minority businesses is the Minority Business Administration, a nationwide organization that

(Continued on Page 98)

DECEMBER IMS CLASSES ?

With everyone thinking about the holidays and budgets running low, who would offer public IMS classes in December?

Informatics Data Base Specialty Services would. We've been so busy this year that we've only had time to teach private on-site classes and some of the biggest and best IMS shops in the country have experienced the benefits of our Instructor/Consultant approach. In December we have a breather before an already heavily booked 1981 (our clients run out of budget, too!), and this makes December your best opportunity to try the highest quality IMS education in the country on a 'seat at a time' basis. The offerings are:

Class	Per Student Price	Location	Date(s)
Fundamentals of IMS/VS	$200	Dallas	12/1
		San Francisco	12/8
IMS/VS Basic Programming	$325	Dallas	12/2-3
		San Francisco	12/9-10
IMS/VS Advanced Programming	$325	Dallas	12/4-5
		San Francisco	12/11-12
Programming for MFS	$500	Houston	12/10-12

Even though it's December, we expect these classes to fill up fast. To reserve seats, call Chuck (214-696-1900), Shirley (713-680-2100), Clay (415-777-1536), or Delfina (415-964-9900). If it helps your budget, we'll bill you in January.

By the way, the reason we're so busy is that more companies are discovering that on-site education enhances productivity and reduces turnover. You owe it to your company to learn about our full catalog of IMS, SNA and ADF offerings before our 1981 schedule is full.

Data Base Specialty Services
1121 San Antonio Road
Palo Alto, CA 94303

informatics inc

Blumenthal Takes Burroughs Reins Early



Paul S. Mirabito

DETROIT – W. Michael Blumenthal took over as chief executive officer of Burroughs Corp. late last month after Paul S. Mirabito stepped down three months earlier than expected. Blumenthal will also succeed Mirabito as chairman of the board on Jan. 1. Until then, Mirabito will continue as board chairman.

In disclosing the surprise move, Mirabito said Blumenthal's early election to the top slot at Burroughs would facilitate a more orderly transition.

Since Blumenthal left Bendix Corp. to join Burroughs last February, industry observers have anticipated a management shakeup at the firm.

Perhaps signaling the start of other changes to come, Mirabito also announced that Jerome Jacobson was named vice-chairman and a director of the firm. A long-time associate of Blumenthal, Jacobson, who until recently was executive vice-president of Bendix Corp., will spearhead Burroughs' strategic planning activities.

These management changes come at a time when Burroughs is experiencing some difficulty with earnings and production. Although a tightly managed and profitable firm, Burroughs in its second quarter announced an earnings drop of 12%, the first time in 17 years earnings did not top a previous quarter.

In addition, Burroughs has reportedly experienced some production problems with its new 900 series.



W. Michael Blumenthal

Cbema Reports Exports Rise 35% In Last Quarter

WASHINGTON, D.C. – Exports of computers and business equipment during the second quarter rose 35% to $2.1 billion from $1.5 billion in the same quarter a year ago, according to statistics recently released by the Computer and Business Equipment Manufacturers Association (Cbema).

Exports of computers and related equipment led the quarterly surge, accounting for $1.8 billion, up 41% from last year's second quarter. This represented 85% of total business equipment exports.

Computer and business equipment imports totaled $701 million – only 5.8% more than 1979's second quarter, Cbema reported.

For the year to date, exports of computers and parts rose 37% to $3.5 billion while imports totaled $524 million, up 6.9% from the first half last year.

As a result, the positive balance of trade for the computers and business equipment industry was more than $850 million ahead of last year's favorable trade balance. Cbema expects a favorable trade balance for 1980 of at least $5 billion.

TRW to Service Dataproducts

WOODLAND HILLS, Calif. – Dataproducts Corp. has signed a five-year agreement with the Customer Service Division of TRW, Inc. that makes TRW the exclusive authorized U.S. field service representative for Dataproducts printers.

Until now, all Dataproducts service had been provided by its own customers. Although Dataproducts sells primarily on an OEM basis, many of its customers did not have service capability, the firm noted.

TRW's service will include on-site installation, contract and per call maintenance. TRW will initially offer its service from eight locations in six cities, but the agreement calls for TRW to expand its capability to a minimum of six new cities each quarter. That will make service for Dataproducts printers available from 50 cities within two years.

TELEX SERIES 80: THE BEST TAPE DRIVE FOR 4300 SERIES PROCESSORS.

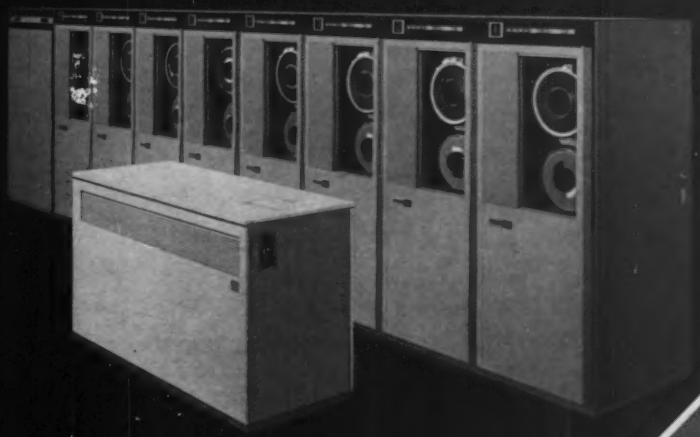
Congratulations. You've upgraded to – or at least ordered – IBM 4300 Series processors to gain major price/performance improvements and environmental enhancements. Now, what about your tape drives?

Telex Series 80 tape drives are the perfect match for 4300 processors. Like the IBM 4300, Series 80 is based on proven technology. It outperforms its competition, and is lower in price.

Series 80 drives offer 6250 bpi (GCR), 1600 bpi (PE) and 800 bpi (NRZI) data formatting – at transport speeds up to 125 ips; all with capabilities beyond those normally required on 4300's and at a price well below IBM's comparable offerings.

Series 80 is smaller and lighter than the IBM 3420 and its equivalents. Five Telex drives fit comfortably in the space normally required by four IBM drives. Series 80 also generates 30% less heat and consumes 35% less power. Patented Telex features like the Supr-Lite™ Capstan and Telex Tape Path ensure smooth, reliable back-up storage.

For more information on the tape drives made to complement your 4300 processor and other IBM systems, contact your nearest Telex representative. Or call Series 80 Marketing toll-free (800) 331-2623.



The innovation continues... TELEX.

Telex Computer Products, Inc.
Terminals/Peripherals; Data Entry and Word Processing Systems; OEM Products
6422 East 41st, Tulsa, Oklahoma 74135, (918) 627-1111
332 Consumers Road, Willowdale, Ontario M2J1P8, (416) 494-4444

Poll Shows Racism Widely Felt by Black DPers

(Continued from Page 96)

McLeod acknowledged the increase in minority job opportunities, but expressed concern over the low number of black managers in DP. On the question of PL 95-507, he said some companies are hiring more minority companies than the law requests.

'It Exists'

An assistant underwriter for the Federal Home Loan Mortgage Corp., Maxine Diggs said, "It exists," when asked about racism, and related her experiences at Digital Equipment Corp., her former employer.

"They like to keep blacks on a low level," she said of DEC. "Their excuse is they want to hold them back until they can place them. I must say, they do a very good job of hiding it."

A senior analyst who asked to remain anonymous did not mince words when discussing racism: "It certainly exists and you can see it in all phases of data processing," he said. "Whites receive special educational favors and learn new advanced techniques."

He predicted whites will be the first to "get into the nuts and bolts" of IBM's H series and thus "gravitate to the top" while blacks are left behind.

Racial Unity

Whites employ racial unity to push other whites up the job ladder and stifle unfavorable conversations about whites, the analyst maintained, adding they frequently confer before meetings in order to present a united front at the meetings.

"IBM and Computer Sciences Corp. are the best and the worst when it comes to employing blacks," he said, adding they are good at hiring, but not at advancing blacks. Stewart could not work at IBM because "I would train the young people to go out to war, so to speak."

Univac is not a desirable place for blacks to work because "they have a high percentage of uneducated people in management," he said.

Joseph Stroy Sr., installation specialist with DEC, called racism in DP "subtle" and no more prominent there than in the country as a whole. DEC is a good company to work for "if you qualify" and, given equal resources, black DP firms can compete with white ones, he said.

Elections Held At BDPA Meet

(Continued from Page 96)

helps minority businesses formulate loan requests, Goode said.

Herbert Byrd, owner of Computer Based Systems, told round-table attendees he has trouble finding technically and managerially qualified minority members. Despite that difficulty, he persists in the search.

"I feel the management should reflect the minority ownership," he said, adding minorities should attempt to acquire management skills such as proposal writing early in their careers. "People have to see you want to be a manager," he said.

Like the other speakers, Charles Stewart, a senior analyst with the D.C. government, stressed the availability of DP jobs in the D.C. area. "I have identified 50 job openings from GS-14 to GS-5 levels," he said.

An abnormal number of early retirements has opened the door to minorities seeking employment, he noted. "Get into the District government and get a foothold," he advised. "There is lots of mobility among district agencies."

BDPA Growth

Before the election of officers, Earl A. Pace Jr., who was subsequently elected BDPA president and chaired the business-like meeting, reviewed the growth of the BDPA and presided over the adoption of national bylaws. Of their adoption, he said, "This makes us a truly national organization."

As a result of an article in *Computerworld*, the BDPA has received inquiries from several states, including Louisiana, where 15 people have expressed an interest. "That's a chapter in itself," Pace noted.

There were also status reports from two of the group's three chapters in Philadelphia, Cleveland and Washington, D.C.

Norman Mays of the Cleveland chapter said members there are riding along on the coattails of the city's revitalization and hope to cash in on some substantial city and federal contracts. Such has not been the case, so far, he said, because "One of the things we lack is we don't know what's going on when those big contracts are being made."

However, like other members, he stressed the fact the BDPA is not lamenting past or present failures, but rather working optimistically toward future successes. Mays was elected vice-president.

PDP-11 Owners... 35% off.



RK06 Disk Drives Immediate Delivery!

If you've been thinking about adding disk capacity, now's the time. Digital's RK06 disk drives are ready and waiting. Features include: low-profile cab; top-loading 2-platter cartridges; 14 megabytes of storage; average access and seek times of 50.5 msec and 38 msec, respectively; peak transfer rate, 538,000 bytes per sec. High reliability. Daisy chain up to eight drives per controller.

For ordering information, call 800-258-1793,* 8 to 5 EST. Don't delay, call today. Quantities are limited.

Digital Equipment Corporation
522 Amherst Street
Nashua, NH 03063

digital
We change the way the world thinks.

*New Hampshire, Alaska, Hawaii residents, dial 603-884-7240.

Perkin-Elmer
FOX 1100's NOW! Limited Offer.
$895.
QWIKTERM
Boston (617) 246-1665
San Francisco (415) 461-8923
Washington, D.C. (703) 522-1218

POSITION ANNOUNCEMENTS

Computer Sciences Corporation

Computer Sciences Corporation's Business Services Division provides accounting and related services to a variety of commercial customers with such applications as accounts payable and receivable, general ledger and payroll. Continued success has created a wide range of opportunities at our Data Centers and Marketing Offices in these locales: Boston, Mass.; Cleveland, Ohio; Long Island, New York City & White Plains, NY; Philadelphia & Pittsburgh, PA; New Jersey; Lansing, Mich.; Dallas, TX; Huntington Beach, Oakland, San Francisco & San Diego, CA.

General Manager

Seek an individual with 7-10 years progressively responsible experience in a service bureau environment, including proven strengths in management and interpersonal communication. Will manage data center and marketing force, accountable for supervision of professionals, technicians, clerical personnel and sales group as well as overseeing profit and loss of center.

Operations Manager

Calls for an extremely capable individual who can manage programming, computer operations, data entry, data control and production efforts. Requires 3-5 years general experience in a service bureau environment, along with proven managerial and interpersonal effectiveness.

Marketing Representatives

We seek enterprising, enthusiastic individuals to sell payroll, accounts receivable and accounts payable products in a service bureau environment. Proven track record in marketing accounting-related products or services needed; previous experience with one-write systems would be a natural.

Account Representatives

Calls for 3 years experience with COBOL, FORTRAN or a data base management language, preferably in a network environment. Should have knowledge of medium-to-large-scale hardware and software systems, plus demonstrated initiative, leadership and communication skills.

Customer Service Representative

Will provide technical support to marketing representatives during sales closings, as well as implement and install such accounting systems as billing, sales analysis, inventory control, accounts payable/receivable, general ledger and payroll. Positions involve heavy outside client contact within local territory, and require BA/BS degree or equivalent with a strong accounting background.

We offer a very stimulating professional atmosphere, unparalleled opportunity for growth, and an attractive total compensation package including wide-ranging benefits.

For positions east of the Mississippi, contact: Rolfe Schroeder TOLL-FREE (800) 336-3066, or send your resume to Ms. Annette Fileccia, Computer Sciences Corporation, 3 Corporate Park Drive, White Plains, NY 10604.

For positions west of the Mississippi, contact: Craig Bucy or Mary Ann Dunleavy TOLL-FREE (800) 421-2086 (in California [213] 615-0311), or send your resume to Mr. Craig Bucy, Computer Sciences Corporation, 650 N. Sepulveda Blvd., El Segundo, CA 90245.

The only limitations are the ones you bring with you.

CSC

BUSINESS SERVICES DIVISION

An Equal Opportunity Employer M/F/H

Experienced Programmers and Analysts

Send resumes to: Mark C. Grove, Recruiting Office, Ætna Life & Casualty, 79 Farmington Avenue, Hartford, CT 06156, (203) 273-6828. An equal opportunity employer.

Ætna LIFE & CASUALTY

ROBERT HALF

PACIFIC NORTHWEST

Washington, Oregon, Idaho & Alaska

PROGRAMMERS/ANALYSTS

Do you have 1+ years experience in business applications? Do you plan to visit or relocate to this area?

If so, we can arrange interviews for you. Call us collect or send your resume and itinerary and we will get right to work.

Ray Magill, CDP
ROBERT HALF
of Seattle, Inc.
1301-5th Avenue
Suite 2626
Seattle, Wash. 98101
(206) 624-9000

Bob Clawson
ROBERT HALF
of Portland, Inc.
1 SW Columbia
Suite 850
Portland, Ore. 97258
(503) 222-9778

We're Looking For Software Specialists Who Have An Appetite For Creative Problem Solving . . .



...on the San Francisco Peninsula

We are building major defense related real-time information processing systems for reconnaissance/intelligence applications. Communications intelligence, electronic intelligence, digital voice processing, pattern recognition, and signal processing are some of the functions which our systems perform.

These systems provide the challenges which will make tomorrow's outstanding software engineers.

The software technology encompassed by these systems includes:

- Process Control
- Data Base Systems (relational and network)
- Scientific Applications
- Signal Processing
- Artificial Intelligence
- Network Architectures and Protocols
- Fault Tolerance and Recovery
- Man-Machine Interface (query languages, command languages, & graphics)

The hardware environment includes, but is not limited to: PDP 11/70's and VAX's, Perkin-Elmer 3240's, ROLM 1602's through 1666's which are quite similar to some of those in Data General's series, and a variety of microprocessors and other ruggedized computers.

We are fully committed to software engineering development methodologies. We write complete functional requirements, high-level designs, detailed designs, and structured code. Each step is or will be supported by software tools.

You'll enjoy an excellent salary and benefits package including tuition reimbursement, medical, dental and stock purchase plan. Please forward your resume to **GTE Sylvania, Employment Office, Dept. CB-218, 100 Ferguson Drive, Mountain View, CA 94042.** We are an equal opportunity employer, minorities and females are encouraged to apply. U.S. citizenship required.

GTE SYLVANIA INCORPORATED

DALLAS

Prog/Analyst

Major Metroplex corp is seeking strong COBOL, IBM DOS or OS applyst blgrnd to develop new systems. Salary to $25k. Degree required.

Suite 1109, Stemmons Tower W. Dallas, TX 75207. (214) 637-6360

DATA PROCESSING CAREERS inc

FT. WORTH

Project Mgr.

New IBM 4331 shop. Direct the activities of programmers in development of on-line financial systems. Background in CICS and data base A plus. Relo paid, salary to $28K + bonus.

Suite 911, One Summit Ave Ft Worth, TX 76102 (817)336-4565

DATA PROCESSING CAREERS inc

KANSAS CITY

PERF-MEAS to $35K
MVS Software to $32K
IMS DB Anal to $32K
Systems Anal to $30K
IMS P/A to $28K
Total DB Anal to $26K
CICS P/A to $26K
COBOL/PL/1 Prog to $24K

6405 Metcalf, Shawnee Mission Kansas 66202 (913) 236-8288

DATA PROCESSING CAREERS inc

TULSA

Technical Support

Major energy companies require extensive MVS support experience in Capacity Planning, Configuration Planning, Performance Analysis, Computer Security, and Communications. **Salaries to Mid-$30's.**

2624 E. 21st St., Tulsa, OK 74114 (918) 747-3621

DATA PROCESSING CAREERS inc

Sr. Systems Analyst/Programmer
Jr. Systems Analyst/Programmer

Due to expansion and growth, a large leading medical facility located in Central Texas is presently offering opportunity to ambitious System Analyst/Programmer professionals. Excellent working conditions, living in a pollution free area among the friendly Texas atmosphere. Tops in benefits including medical service to immediate family. D.P. running on a 370-158 utilizing DOS/VS, CICS, DL1 data base, COBOL and some RPG.

Send Resume to:
Mildred Lewis
Scott & White Hospital
2401 S. 31st. St.
Temple, Texas 76508
EOE

Manager of Planning & Control

This newly created position in the Sunbelt of the Southeast is primarily responsible for the budgeting, costing, planning, and systems assurance functions and will report directly to the General Manager. Our client, a highly respected and rapidly growing company, enjoys a reputation for excellence and offers fine career opportunities. Compensation is competitive, with outstanding relocation arrangements. Growth potential is superb.

The ideal candidate must have: Managerial ability • Accounting Experience and/or Education • Budgetary, Costing & Financial Planning Experience • Large Scale IBM Systems Experience • Banking Data Processing Experience.

We are consultants to management. For confidential consideration, please send resume and salary history to: William F. Lee, Professional for Computing, Inc., 12200 Park Central Drive, Suite 480, Dallas, TX 75251. (214) 385-0075. Employer assumes fee.

professionals for computing, Inc.
Search and Personnel Services

MOVE SOUTH NOW!



Don't wait another winter! We work with over 3,000 sunbelt companies. Our computer will match your skills to their needs. Client companies pay all fees. Send resume to: **Data Processing Dept.**

LANDRUM
Personnel Associates
P.O. Box 13730
Pensacola, Florida 32596
CALL TOLL FREE (800) 874-2407

TRIMBEC EMPLOYMENT CONSULTANTS **inc.**

Specializing in career placement of EDP personnel of all disciplines. Our nationwide clients offer opportunities spanning the full spectrum of the Data Processing Field. Send resume, salary history and geographic preference to the attention of Adele Durham, Data Processing Division. All inquiries will receive immediate response.

425 Electronics Parkway
P.O. Drawer 40 Liverpool, N.Y. 13088 (315) 451-4220
WE KNOW THE PEOPLE YOU NEED TO KNOW

If only we knew what you know.

We could zero in on the career spot that's on your mind. That rewarding growth spot. We're specialists when it comes to properly placing D.P. Professionals. So why not tell us what you know . . . in a confidential interview. Simply call or write:

N.Y. — 535 5th Ave., New York 10017 (212) 867-2650
N.J. — 30 Vreeland Rd., Florham Pk. 07932 (201) 966-0900
Calif. — 3255 Wilshire Blvd., Los Angeles 90010 (213) 384-4900
Texas — 3050 So. Post Oak Rd., Houston 77056 (713) 961-3600

the jarvis walker group

COMPUTER SALES ENGINEERS
SYSTEMS ANALYSTS
& CONTRACT PROFESSIONALS



"Beyond technology we have the TROOPS!"

Since introducing the first 32-bit mini to our latest success, the model 3240, we have clearly been the leader in 32-bit technology. Future product offerings will continue to keep us ahead of the industry and our dominance in the 32-bit arena will become even more evident in the next 12 months. We are proud of our technological innovation, our product superiority, and our deep commitment to setting the pace in advancing technology.

Sales Engineers

Successful computer sales engineers at Perkin-Elmer are degreed and have a strong technical background with recent experience selling computers, software, or systems, and a desire to succeed. Your earnings are only limited by your efforts and potential.

Systems Analysts

Perkin-Elmer has one of the finest field analysts forces in the computer industry today. They have a degree in E.E., Computer Science or Math, and at least 3 years experience in computer systems support preferably in a sales support environment. They have experience in operating systems, COBOL, FORTRAN or assembly language programming in the real time environment. Sales/sales support opportunities currently exist in the following cities:

NORTHEAST REGION: Philadelphia, Hartford, Long Island, New York City. SALES ENGINEERS, CONTACT: Dan Roberts, Regional Manager, SYSTEMS ANALYSTS, CONTACT: Jeff Aakjer. Perkin-Elmer, U.S. Computer Sales, 2 Crescent Place, Oceanport, N.J. 07757. (201) 229-6800.

MIDWEST REGION: Chicago, Detroit, Milwaukee, Cleveland. SALES ENGINEERS, CONTACT: Bill Polak, Regional Manager, SYSTEMS ANALYSTS, CONTACT: Jim Warsaw. Perkin-Elmer, U.S. Computer Sales, 415 W. Golf Road, Arlington Heights, Illinois 60005. (312) 437-5120.

SOUTHERN REGION: Dallas, Tulsa, Houston, Huntsville, Atlanta. SALES ENGINEERS, CONTACT: Homer Thornton, Regional Manager. SYSTEMS ANALYSTS, CONTACT: Ted Gillam. Perkin-Elmer, U.S. Computer Sales, 1011 South Sherman Street, Richardson, Texas 75081. (214) 234-8880.

WESTERN REGION: Santa Clara, San Francisco, San Diego, Denver, Seattle. SALES ENGINEERS, CONTACT: Bill Thompson, Regional Manager, SYSTEMS ANALYSTS, CONTACT: Dave Reed. Perkin-Elmer, U.S. Computer Sales, 3255 Scott Blvd., Building #3, Santa Clara, Calif. 95051. (408) 727-5540.

Contract Professionals

Perkin-Elmer has unique career opportunities for contract professionals with experience in Federal and commercial contracts. We currently seek contract managers for the following locations: California, Texas, Illinois, & New Jersey. Applicants should possess a business degree or equivalent, professional experience, have substantial experience in contract drafting and negotiating of both government and commercial terms and conditions for the sale of minicomputers or similar high technology products.

If you feel you would like to become one of the industry's top professionals, send your resume including salary history to: Todd McGovern, U.S. Computer Sales, 2 Crescent Place, Oceanport, N.J. 07757.

PERKIN-ELMER offers a comprehensive compensation package including paid dental plan, paid health insurance, paid life insurance, credit union and many more. For immediate and confidential response for any of the above career opportunities please send resume to the contacts indicated or Todd McGovern at the above address. (Agencies should send resumes to Mr. McGovern at the above address.)

PERKIN-ELMER

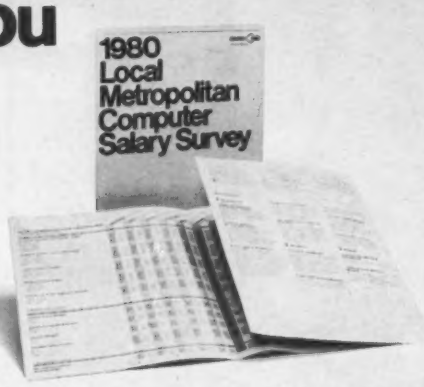
an equal opportunity employer m/f

position announcements | position announcements | position announcements | position announcements | position announcements

Computer Professionals...

Are you making as much money as you should be?

To find out, call today for our new local survey It's FREE!



Includes 23 New Categories

The 1980 Survey has been expanded to provide specific data for 23 new categories. These include positions in data communications, mini/micro programming, data base administration, technical marketing support and EDP auditing in addition to our traditional categories of programming, software, systems design, management and computer marketing.

Do you know how your salary compares with other EDP professionals in your specialty—with the same level of experience—working in your city, or in other cities across North America? Are you being well paid for what you do? Are salaries better elsewhere?

Now you can find out simply by calling today and asking for a copy of our current 1980 Local Metropolitan Computer Salary Survey. It's FREE!

Source Edp, North America's largest recruiting firm specializing in the computer field, publishes this valuable Survey annually as a service to computer professionals from coast to coast. The 1980 Survey shows current salaries in your area, 37 other areas in the U.S. and Canada, plus overall national averages. Salaries are shown by career specialty broken down by length of experience or size of computer system.

As you will discover, this Survey can be extremely valuable in helping you make important career decisions. Call for your free copy today.

For your free report, simply phone the Source Edp office nearest you.

source edp

If unable to call, write
Source Edp, Dept. **CL 9**
100 South Wacker Drive
Chicago, Illinois 60606

(When writing, please be sure to indicate home address and position title). Client companies assume our charges.

United States

Arizona
Phoenix 602/258-9333

California
San Francisco 415/434-2410
Palo Alto 415/856-0600
Los Angeles 213/386-5500
Van Nuys 213/781-4800
Torrance 213/540-7500
Irvine 714/833-1730
San Diego 714/231-1900

Colorado
Denver 303/773-3700
Englewood 303/571-4450

Connecticut
Hartford 203/522-6580
Stratford 203/375-7240

District of Columbia 202/466-5890

Florida
Miami 305/624-3536

Georgia
Atlanta Central 404/588-9350
Atlanta Suburban 404/325-8370

Illinois
Chicago 312/782-0857
Northfield 312/446-8395
Oak Brook 312/986-0422
Rolling Meadows 312/392-0244

Indiana
Indianapolis 317/631-2900

Louisiana
Baton Rouge 504/924-7183
New Orleans 504/561-6000

Maryland
Baltimore 301/727-4050
Towson 301/321-7044

Massachusetts
Boston 617/482-7613
Wellesley 617/237-3120

Michigan
Detroit 313/259-7607
Southfield 313/352-6520

Minnesota
Minneapolis 612/544-3680
St. Paul 612/291-2467

Missouri
St. Louis County 314/862-3800
St. Louis Downtown 314/231-4880
Kansas City 816/474-3393

New Hampshire
Nashua 603/880-4047

New Jersey
Cherry Hill 609/482-2600
Edison 201/494-2800
Paramus 201/845-3900

New York
Midtown 212/736-7445
Wall Street Area 212/962-8000
Long Island 516/364-0900
White Plains 914/683-9300

North Carolina
Greensboro 919/378-1642

Ohio
Cincinnati 513/769-5080
Cleveland 216/771-2070
Columbus 614/221-2070

Oregon
Portland 503/223-6160

Pennsylvania
Philadelphia 215/665-1717
King of Prussia 215/265-7250
Pittsburgh 412/261-6540

Texas
Dallas 214/387-1600
Fort Worth 817/338-9300
Houston Central 713/751-0100
Houston Suburban 713/626-8705
San Antonio 512/344-0217

Virginia
McLean 703/790-5610

Washington
Seattle 206/454-6400

Wisconsin
Milwaukee 414/277-0345

Canada
Toronto 416/865-1125
Don Mills 416/425-5730

DBMS PRODUCT DEVELOPMENT AND SUPPORT

APPLIED DATA RESEARCH, the world's oldest and largest independent systems software products company, currently has available employment opportunities for programming personnel in state-of-the-art product development and support for the Company's Dallas-based **DATACOM DB/DC** product group.

Candidates for all positions must be skilled in IBM Assembly language and have a minimum of 3 years programming experience. Some data base, data communications, and/or systems programming experience very desirable.

ADR OFFERS:

- Competitive base salary **PLUS** semi-annual bonuses
- Superior work environment
- Excellent benefits including hospitalization, major medical, dental, prescription drug plan, tuition assistance, life insurance, long-term disability, paid sick leave and retirement.

Persons desiring to be considered for career opportunities with ADR should forward a resume, in strictest confidence, including salary history, to:

Personnel Director
APPLIED DATA RESEARCH, INC.
8515 Greenville Avenue
Dallas, Texas 75243

An equal opportunity employer m/f/h/v

ADR

GET AN EDP JOB ANYWHERE



Analysts, project leaders, programmers with more than a year's experience let us help you find a better job. For a decade we have been placing EDP professionals like you all over the country through our network of 26 national offices. Send your resume or call

Electronic Systems Personnel
858 TCF Tower, 121 So. 8th Street
Minneapolis, MN 55402

client companies assume our fee.

eep
EDP Placement Specialists
A Member of National Computer Associates

DATA BASE CONSULTANT
UNUSUAL OPPORTUNITY

DBD Systems Inc., a worldwide leader in Data Base consulting and education, offers career opportunities in the New York and Washington D.C. areas to qualified professionals. Skills and experience in Data Base Management Systems (IMS, IDMS, ADABAS, SYSTEM 2000, TOTAL) and/or Data Dictionary Systems is essential. Ability to communicate effectively, both verbally and in writing, is a definite plus.
Compensation will reflect experience. Excellent benefits package.

ATTENTION
INFO '80 ATTENDEES
Interviewing at N.Y. Hilton
Please call for appointment
(516) 678-1447, or send resume
in confidence to:

DBD SYSTEMS, INC.
100 North Centre Ave.,
Rockville Centre, NY 11570

DBD

CONNECTICUT

BREEN DATA

THE DATA PROCESSING PERSONNEL SERVICE
Representing:

- ☐ PROGRAMMERS
- ☐ SYSTEMS ANALYSTS
- ☐ SOFTWARE
- ☐ DP MANAGEMENT

☐ STAMFORD/Tony Aceto (203) 322-5761
☐ HAMDEN/Toby Brimberg (203) 288-7461
☐ HARTFORD/Jane Sheehan (203) 247-9112

BREEN DATA ☐ 3780 Whitney Avenue, Hamden, Connecticut 06518

DATA PROCESSING

PHOENIX-NEW MEXICO-COLORADO-CAL-TEXAS

Our client companies have openings for experienced people in various data processing disciplines. Salary ranges are from $18,000 to $35,000 for programmers to project leaders. Call to investigate the opportunities available for your career advancement. Complete confidentiality is assured.

All positions fee paid

FORTUNE PERSONNEL OF PHOENIX, INC.
4001 N. 32nd St. Phoenix, AZ 85018
Phone: 1-800-528-1903

Computer Software Opportunities

The Aerospace Corporation is a private non-profit corporation dedicated to national security needs through the application of objective, experienced technical expertise. Engineers, mathematicians and computer scientists at the graduate degree level with experience and a desire to commit their knowledge to analysis and systems engineering are invited to inquire about these career appointments.

Applicants should have experience in one or more of the following:

- Application software
- System simulation
- System software
- Computer architecture
- Digital image processing
- Computer hardware technology
- Signal processing
- Distributed processing
- Software systems modeling and evaluation
- Mission planning and mission system analysis

You may explore these opportunities by forwarding your resume to:

Professional Placement
Department C108
P.O. Box 92957
Los Angeles, CA 90009

The Aerospace Corporation

Where There's Space For Your Ideas
An Affirmative Action Employer
U.S. Citizenship Required

EDP SPECIALISTS

SOFTWARE ENGINEERS/EDP MGT/ SYSTEMS ANALYSTS / PROGRAMMERS, $17,500-$57,800. Mpls, Midwest & National listings. Send resume to EDP Specialist, J. R. Shoemaker, ABC EMPLOYMENT SERVICE, 401 2nd Ave. S., Minneapolis, MN 55401 (612/339-1453) (Collect) (Highest Quality of Life Anywhere).

EDP CAREER OPPORTUNITIES – Sunbelt, national and international. $18,000-$50,000. Positions available in all areas of data processing. Let a professional represent you. Call or send resume w/salary history in confidence to W. L. Williams, LLOYD RICHARDS PERSONNEL, 507 S. Main, Suite 502-C, Tulsa, OK 74103 (918/582-5251) "Professional personnel service for over 20 years."

PROGRAMMERS/SYSTEMS ANALYSTS, $18,000-$45,000. Have a great fall in New England! Send resume or call Dick collect at oldest employment service in Central NE (estab. 1946). LANE EMPLOYMENT, 405 Main St., Worcester, MA 01608 (617/757-5678).

EDP MANAGEMENT/SYSTEMS ANALYSTS/PROGRAMMERS, $18,000-$40,000+. Choice upstate NY & U.S. openings. Entry level thru top corporate positions. EDP placement specialists. In confidence send resume or call James F. Corby, Pres., NORMILE PERSONNEL, 5 Leroy St., Box 110 Westview Station, Binghamton, NY 13905 (607/723-5377).

PROGRAMMER ANALYSTS / SOFTWARE DEVELOPMENT, $20K-$33K. Major clients seeking experienced software people for design & tech support positions. Midwest locations. Send resume in confidence to Scott Sarsgland, O'CONNELL-SCHMIDT-ROHN, INC., 757 North Broadway, Milwaukee, WI 53202 (414/224-9500).

EEs, PROGRAMMERS, SYSTEMS ANALYSTS, $16,000-$45,000. Immediate outstanding opportunities. Sunbelt. Nationwide. Positions available at all levels. Our clients include many of the nation's largest and most dynamic companies, in every major industry group. Reply in confidence to J. F. Halloran, President, NATIONAL SEARCH, P.O. Box 73006, Houston, TX 77090 (713/440-7470).

all positions listed are fee-paid

npc NATIONAL PERSONNEL CONSULTANTS

IS THERE A TECH SUPPORT PROFESSIONAL IN THE HOUSE?



There are Tech Support Analysts, then there are Bank of America Tech Support Analysts. The processing window at our San Francisco Data Center is so tight, that our nine IBM mainframes must be as dependable as a heartbeat. And it takes a special kind of professional team to monitor this heartbeat: Bank of America Tech Support Analysts.

This team of experts work together to troubleshoot the entire data processing system and keep it on the air. Our San Francisco Data Center utilizes seven 3033's running MVS REL 3.8, JES3 REL 3, IMS and batch twenty-four hours a day, seven days a week, plus two 168's utilizing VM and an Amdahl 470/V8 utilizing NCSS-VP.

You'll meet these demands with 12-hour shifts for three days on, then de-pressurize with four days off. And what a four days you can have in the San Francisco Bay Area. Take a long tour of the Wine Country. Or ski at Lake Tahoe.

In addition to top-level challenge, state-of-the-art technology and an enviable location, Bank of America offers incredible computer resources and multiple career paths. We'll keep you in opportunities throughout your career. You'll also receive an excellent salary and benefits package.

To meet this challenge, your background should include experience in one of these three areas:

Operating Systems Software – three years of MVS JES2/JES3 on system 370/158 and larger processors plus solid knowledge of MVS, JCL, IBM utilities and MVS externals; knowledge of IMS, VSAM, RESOLVE and IBM 3705 or Memorex 1270 transmission control units is preferred.

Field Engineering – two to five years experience in maintenance of large IBM mainframes or PCM's.

Computer Operations – five or more years experience operating large mainframes running under MVS JES2/JES3 operational knowledge of IMS, VSAM, RESOLVE and IBM 3705 or Memorex 1270 transmission control units is preferred.

The demands are great. But so are the rewards. If you can meet the challenge of being on call for Bank of America, please send your resume and salary history to us c/o Charles B. Smith, Dept. 3411S, P.O. Box 37000, San Francisco, CA 94137. We are an equal opportunity employer.

BANK OF AMERICA

BANK OF AMERICA NT&SA
MEMBER FDIC

Software/ Hardware Engineering Manager

Requires thorough knowledge of the DEC PDP 11-03 or similar computer, both programming at assembly level in MACRO 11 and hardware interfacing using TTL and CMOS. Experience with bus-structured systems, random logic design, and analog interfacing also necessary. Minimum of 5 years experience as software engineer or related occupation (hardware/software). BSEE or equivalent. Salary $36,000.

Please send resume to: Mr. C.N. Clive, Dept. HR.

MECH•EL INDUSTRIES INC.
17 Everberg Road
Woburn, MA 01888
An Equal Opportunity Employer

SYSTEMS SOFTWARE PROGRAMMER/ANALYST TANDEM FROM 35K

Applied Data Systems, a well established Phoenix based computer company, is seeking a strong Systems Software Programmer/ Analyst with extensive Tandem computer software experience.

Excellent fringe benefits including medical, dental, life & accident insurance as well as an outstanding pension plan.

Send Resume to:
ADS/SSPA
P.O. Box 2088
Scottsdale, AZ 85252



Anyone can find jobs in data processing. But, the really good positions are hard-to-find.

Robert Half offices have specialized in finding the best edp positions for more than 30 years ...since it all began.

We have 70 conveniently located Robert Half offices in the United States, Canada and Great Britain. Look us up in the White Pages.

ROBERT HALF[SM]
data processing and financial personnel specialists

• ALBUQUERQUE • ALLENTOWN • ATLANTA • BALTIMORE • BIRMINGHAM • BLOOMINGTON (MN) • BOSTON • BUFFALO • CHICAGO • CINCINNATI • CITY OF COMMERCE (CA) • CLAYTON • CLEVELAND • CLIFTON (NJ) • COLUMBUS • DALLAS • DAVENPORT • DAYTON • DENVER • DES MOINES • DETROIT • FORT WORTH • FRESNO • GRAND RAPIDS • GREENSBORO • HARTFORD • HAYWARD • HOUSTON • INDIANAPOLIS • JACKSONVILLE • KANSAS CITY • LEXINGTON • LONG ISLAND • LOS ANGELES • LOUISVILLE • MEMPHIS • MIAMI • MILWAUKEE • MINNEAPOLIS • NEW ORLEANS • NEW YORK • OMAHA • ORANGE (CA) • PALO ALTO • PHILADELPHIA • PHOENIX • PITTSBURGH • PORTLAND • PROVIDENCE • SACRAMENTO • ST LOUIS • ST PAUL • SALT LAKE CITY • SAN ANTONIO • SAN FRANCISCO • SAN JOSE • SCHAUMBURG (IL) • SEATTLE • STAMFORD (CT) • TAMPA • WALNUT CREEK (CA) • WASHINGTON, D.C. • WILMINGTON • CANADA: CALGARY • TORONTO • VANCOUVER • GREAT BRITAIN: BIRMINGHAM • LONDON

c 1980 R-H International, Inc.

Programmer

SYSTEMS PROGRAMMER

The COMSAT Computer Center has an immediate need for a systems programmer to help support its IBM 3032 and 4331 systems. We offer a small group environment where individual contribution can be recognized and the opportunity to work with a diverse mix of VM and MVS software products.

Duties of this position include planning, installation, modification and support of operating systems and program products, including tuning, problem diagnosis and resolution, and user technical support.

Candidates must have a Bachelor's degree in Computer Science, Mathematics, Engineering or Physical Science and experience in any of the following areas:

- **MVS or VM operating system generation, maintenance and modification;**
- **TSO or CMS usage, system modification and user support;**
- **CICS installation and application support;**
- **Teleprocessing software installation and network support, expecially TCAM, VTAM and NCP.**

Join the COMSAT team for rewarding professional employment that offers excellent salary and benefits including continuing education, medical, dental and life insurance, retirement and stock plans, etc.

Please send resume, including salary history, to Dept. CW-63-L, or call COLLECT (301) 428-4222 for an application.

COMSAT
COMSAT LABORATORIES
COMMUNICATIONS SATELLITE CORPORATION
22300 COMSAT DRIVE • CLARKSBURG, MARYLAND 20734

An Equal Opportunity/Affirmative Action Employer

ENGINEERING SUPPORT and SCIENTIFIC PROGRAMMING

J.E. Sirrine Company, one of the nation's top engineering firms offers exceptional career opportunities to qualified personnel in:

Engineering Analysis

for degreed Engineers with computer background and experience and/or interests in scientific programming and engineering support for:

- **Mechanical**
- **Electrical**
- **Civil/Structural**
- **Environmental**
- **Graphics**
- **HVAC**
- **Process**
- **Energy**

and other engineering disciplines

Our Corporate Data Center is in Greenville, South Carolina, listed by Fortune and Money magazines as one of the nation's top growth areas. We also have remote computer sites in Houston, Texas and Research Triangle Park, North Carolina.

For immediate consideration, please forward your resume and salary requirements, in confidence, to:

Personnel Director

J.E. SIRRINE COMPANY

ARCHITECTS • ENGINEERS • PLANNERS

Post Office Box 5456
Greenville, S.C. 29606

An Equal Opportunity Employer M/F

NO AGENCIES PLEASE

Fifty Years of Innovation

Systems Programmers MVS-JES3-IMS

Openings for Dallas & Lewisville

Join Texas Instruments in the heart of the Sunbelt. You could work in Dallas, TI's hometown, or just north of Dallas in Lewisville, a growing community of 30,000. Live better in Texas, where cost of living is below the average of major U.S. cities and where there is no state income tax.

TI is building one of the largest worldwide networks of Data Processing Centers. This network is supported from the Dallas headquarters and will include installation and support of major domestic and international computer centers in: Lewisville, Texas; Freising, Germany; Nice, France; Bedford, England; and Tokyo, Japan.

To support this network, we are building a staff of Systems Programmers with MVS, JES3, IMS or TSO background. If you have at least 2 years of systems programming experience and are interested in establishing a long-term relationship with a progressive organization, call: John Heft at 1-800-527-3574 (toll-free) or if calling within Texas call (214) 995-3275. Or send your resume to P.O. Box 2103/Richardson, TX 75080. **U.S. citizenship or permanent U.S. residency required.**

TEXAS INSTRUMENTS
INCORPORATED

An equal opportunity employer M/F

COMPUTER PROFESSIONALS

LIFE IS BETTER IN DALLAS!
$18,000 TO $35,000

Since 1970 we have specialized exclusively in the successful counseling, representation, and career advancement of hundreds of computer professionals like yourself. Currently we have numerous opportunities for

- **COBOL, ALC (BAL), RPG, PL-1, FORTRAN Programmers, Programmer/Analysts**
- **IBM DOS, VM, OS/VS1, SVS, MVS, CICS, IMS System Programmers**
- **Mini Computers/Real Time Programmers**
- **Marketing/Marketing Support Reps**

Send your resume or call us today! We know the Dallas data processing marketplace. Fees paid by client companies.

DataPro
DATA PROCESSING PERSONNEL CONSULTANTS

5580 LBJ FREEWAY SUITE 650
DALLAS, TEXAS 75240 (214) 661-8600
Member of National Computer Assoc

PROGRAMMERS AND ANALYSTS

Free Employment Service
Northeast, Southeast & Midwest U.S.

Scientific and commercial applications • Software development and systems programming • Telecommunications • Control systems • Computer engineering • Computer marketing and support.

Call or send resume or rough notes of objectives, salary, location restrictions, education and experience (including computers, models, operating systems and languages) to either one of our locations. Our client companies pay all of our fees.

RSVP SERVICES, Dept. C
Suite 700, One Cherry Hill Mall
Cherry Hill, New Jersey 08002
(609) 667-4488

RSVP SERVICES, Dept. C
Suite 300, Dublin Hall
1777 Walton Road
Blue Bell, Penna. 19422
(215) 629-0595

RSVP SERVICES
Employment Agency for Computer Professionals

Fifty Years of Innovation

Consumer Electronics Opportunities

Lubbock Openings

Texas Instruments has immediate openings for the following positions:

Educational Products Marketing Manager
Develop marketing strategy for microcomputer educational software products. Perform marketing analysis and market segmentation studies. Select software packages and establish schedule priorities. Identify and help stimulate 3rd party software and course-ware development. Position data-base strategy to support educational requirements.

Position requires a BS or MBA in Education or Marketing and 3-5 years' experience in developing or marketing computer-aided educational material for either institutional or industrial education environment.

Software Products Marketing Engineer
Develop marketing strategy for microcomputer software products. Perform marketing analysis and software package selection. Handle pricing, merchandising, and 3rd party software development negotiations.

Position requires a BSEE or related field and 3-5 years' experience in marketing planning support or management, preferably in the personal computer sector.

Software Design Engineer
Duties include design, documenting, programming, integrating, and testing computer applications software programs, and development of new and existing computer packages for retail marketing.

Position requires a BS or MS in Computer Science, EE or related field, and the ability to program in basic PASCAL and assembly level language.

Interested applicants should send resume in confidence to: Gary Sprehe/P.O. Box 10508, M.S. 5890/Lubbock, TX 79408.

TEXAS INSTRUMENTS
INCORPORATED

An equal opportunity employer M/F

Director of Computer Systems

A rapidly-growing, profitable consumer soft goods company located in the New York metropolitan area, we seek a dynamic professional to manage our new computer systems.

To qualify for this position, you must know MUMPS language, and you must have 2-5 years of prior business experience using MUMPS in computer programming. At first, you will supervise our staff of programmers with excellent opportunity for your career to advance further within one year.

Compensation will be competitive and commensurate with your prior experience.

Please reply in confidence, furnishing us with your employment history and present compensation, to

CW Box 2406
375 Cochituate Rd., Rte. 30
Framingham, MA 01701

PROGRAMMER ANALYSTS AND PROGRAMMERS

You're not fenced into a module at NCR/Wichita

You can see your ideas grow into complete systems because the minicomputers we design and produce are *total* systems—complete with hardware, firmware *and* fully integrated software. We are expanding. We have current openings in 15 software categories ranging from very senior positions with heavy operating system architecture responsibilities, to entry level positions for programmers. All have at least 3 things in common.

(1) They offer defined career paths and progressions that can take you to the top of your profession.

(2) They position you in an operation that shortly expects to command an impressive 12% of the *overall* micro/mini market.

(3) NCR/Wichita offers a flexible methodology and informal taskforce approach to problem solving. Nobody gets locked into a specialty. We provide 100% tuition reimbursement for Master's Degree Program at local university.

Match your qualifications to specific opportunities in these areas:

Consulting Analysts
- **Operating system architecture**
- **Logical, physical, communication I/O**

Senior Programmer Analysts
- **Database design**
- **Retail OS for minis**
- **Interactive, real-time systems**
- **Project definition, leadership**

Programmer Analysts
- **Design/program manufacturing control systems**
- **OS development (Assembly language)**
- **Design hardware design aids**
- **OS enhancements, support, maintenance**
- **Virtual system installation/maintenance**
- **Design/implement/test I/O, utilities, SYSGEN**
- **Integration/test software products**
- **Prepare/conduct acceptance tests, CCT/CVT/Beta**
- **COBOL, BASIC**
- **Applications**

Wichita . . . midwest living at its best

We offer stress-free, smog-free, affordable living in a neighborly city of close to 300,000. Industrial diversity includes 3 major aircraft companies. There's a fine graduate school, a medical school, 3 colleges, and research institutions. You'll find art galleries, museums, theater, ballet, a symphony orchestra . . . and more than 6 major lakes within easy drive. Wichita is alive and thriving. We'll introduce you to big city expatriates who wouldn't live anywhere else.

Learn more. Send confidential resume and salary history to:
Paul Coudron, Professional Placement, Dept. J50
Engineering & Manufacturing, NCR Corporation, 3718 N. Rock Road, Wichita, KS 67226.

NCR
Complete Computer Systems

An equal opportunity employer

PROFESSIONAL ENGINEERING OPPORTUNITIES

Paradyne Corporation has secured a key role in the future world of Data Communications through innovative engineering and design concepts. Our professionals today are continuing our sound, successful growth with creative, dedicated approaches to the challenges of tomorrow. We are seeking:

SOFTWARE DESIGNERS

- Designers working on our IBM 370 front end extenders need experience on 16 Bit minicomputers in real time, I/O, handlers, drives and/or systems environment using BAL; IBM Systems experience a plus.
- Experience with the design and development of Systems software, for the UNIX Operating System and the C Language.
- To develop, from inception, our operating system and program products requires knowledge of operating systems and data management access method using BAL or equivalent large mainframe languages.
- Individuals needed to develop our COBOL compiler for the 370 mainframe must have BAL experience; knowledge of COBOL and internals of a compiler is an asset.
- We need individuals with BAL and 16 Bit mini and microcomputer experience; Fortran and Bisyne and/or SDLC protocol experience helpful. Knowledge of Modem hardware and interface of terminal equipment also beneficial.

PROGRAMMER/ ANALYST

- Experience with RPG II is an on-line environment using the IBM SYSTEM 34 and business applications background.

As a respected member of our dynamic growth picture, you will receive a salary commensurate with experience, a full benefits package and unlimited growth potential. Please forward your resume, outlining work history and salary requirements, in confidence to:



Jules E. Zeff
Director of
Professional Recruitment
PARADYNE CORPORATION
8550 Ulmerton Road
Largo, Florida 33541
An Equal Opportunity Employer M/F

ADVANCED SYSTEM PRACTICES CONSULTANTS

Leading international public accounting and consulting firm seeks experienced personnel with expertise in advanced systems and data processing skills. The positions are in the World Headquarters research and consulting group. Responsibilities include consulting with our personnel and clients on high technology engagements and conducting research in advanced system practices. Candidates should have substantial (4-5 years) technical experience with credentials in one or more of the following areas:

- Detail knowledge of CICS with ability to generate CICS and do performance timing.
- Detail knowledge of IMS DB/DC and thorough understanding of logical and physical design.
- Data communications with a detailed knowledge in communications hardware and experience with IBM's SNA.

Candidate must have a college degree, preferably in computer science, MIS, business or engineering. Demonstrated technical skills must be combined with exceptional written and verbal communication skills.

Starting salary will be from high $20's and up, depending on qualifications plus relocation. An opportunity for rapid advancement exists in our organization, with a full employee benefit plan available.

Respond with qualifications and cover letter to:

CW Box 2399
375 Cochituate Rd., Rte. 30
Framingham, Mass. 01701
An Equal Opportunity Employer

MOVE SOUTH

With the Help of
National Personnel Associates

The World's Largest Network of Professional Placement Agencies

Contact any one of the following NPA Affiliates:

FLORIDA
UNSPOILED BEACHES AWAIT YOU
PROGRAMMER ANALYSTS OS or DOS

Cobol, DL-1 ..... to $27K
BAL, Cobol ..... to $25K
VM, PL-1 ..... to $25K
NCR Nest-3/Level 2 ..... to $24K
VS/CICS strong BAL ..... to $24K

SYSTEMS ANALYSTS
Cobol or BAL, Financial, Banking, Life Ins, Mfg. ..... to $30K

SOFTWARE
Systems Programmers ..... to $30K

DB/DC ANALYSTS
IMS, IDMS, TOTAL ..... to $32K

AVAILABILITY, INC.
813-872-2631
Dept. CW, P.O. Box 23434
TAMPA, FLORIDA 33623

ALL VA.-CAROLINAS
CALL COLLECT 919/373-1961

SYS.ANAL.-E.E. or I.E. 36K
SYS.ANAL.(2)-Univac 35K
SYS.ANAL.-ins., PMS,IBM 30K
SYS.ANAL.-Distribution 30K
PROG.ANAL.-Cobol, Burroughs 30K
PROG.ANAL.(5)-Ins. apps 29K
PROJ.LEADER-Bank IMS,D.B. 28K
SYS.DESIGNER(3)-IDMS,IBM 28K
SR.PROG.-NCR Mission 25K
PROG.ANAL.-MRP,CICS 25K
DATA BASE ADM.-Total, IMS 25K
PROG.ANAL.-Cobol,Burroughs 24K
PROG.-DEC PDP11,Fortran 23K
JR.PROG.-IBM 3033,Ins. 18K
JR.PROG.-Cobol,Fin.apps 18K
TRAINEES(Several)-C.S.deg 16K

REGENCY
PERSONNEL CONSULTANTS
823 N. Elm Greensboro, N.C.

E.D.P.

Sr. Prog. — IBM, COBOL, CICS ... mid 20's
P/A — NCR, Nest III ..... to 22K
P/A — FORTRAN ..... to 35K
P/A — Honeywell, COBOL ..... to 25K
Sys. Prog. — IBM, BTAM, CICS ..... hi 20's
S/A — Burroughs, COBOL ..... to 25K
S/A — IBM 3 or 34, RPG II ..... to 26K
S/A — Univac ..... to 35K
Proj. Mgr. — COBOL, data base ... mid 20's
DP Mgr. — IBM 3 or 34, RPG II ..... to 32K

Contact Betty deMartelly
(Call Collect) — Phone: 615-329-1771
DEALY-ROURKE PERSONNEL
1808 West End Bldg., Suite 121
Nashville, Tennessee 37203

S.E. OPPORTUNITIES

Project Leader/Financial	$35K
Banking-370-Assembler	$25K
Sys Prog — Heavy CICS	$30K
DEC/Fortran	$25K
Programmers — Cobol	$21K
Insurance-CICS/Cobol	$27K
Retail/Pos	$28K

NATIONAL PERSONNEL RECRUITERS
8520 Powers Ferry Rd., 6150
Atlanta, Georgia 30339
(404) 955-4221

COLORADO JOB$

Come join one of the fastest growing high technology centers in the U.S. New book, THE COLORADO CONNECTION, TELLS YOU EVERYTHING YOU NEED TO KNOW. Covers Denver, Boulder, Colorado Springs, and Ft. Collins. Employment Guide contains: history, topography, indepth look at contemporary Colorado, aerial photos of cities, details on employment outlook, cost of living, education, housing, the arts and entertainment, and much more. Directory of High Technology Companies contains nearly 400 entries: name, address, phone #, date company was founded, # of employees, description of major products and services, computer systems used. The real growth is just beginning. We believe that no other area in the nation offers more opportunity for the 80's. Author has worked in Colorado as a programmer for over 13 years. Format 8½ x 11, 94 pg. bound book. Send $9.95 plus $1.00 for shipping and handling to: **Magnolia Publishing Co., Box 19542CW, Boulder, CO, 80308.** Visa and MC send # and exp. date or call 1-303-443-9383. Satisfaction guaranteed! 30 day money back return privilege.

Computer Systems Analyst

Design, implement comm'l and industrial programs in BASIC IV and IDOL database system. Analyze programming needs; negotiate sales and service contracts; assist management. Needs M.S. Computer Science; 3 yrs exper. comp. systems analysis incl. 1 yr accounting systems; know BASIC IV language, eqpmt, IDOL system. 40 hrs/wk + O.T.; $1,800/mo. + 1 1/2 O.T. **Resumes to General Universal Systems, 6161 Savoy #1034, Houston, Tx., 77036.**

IMS Professionals
LOS ANGELES AREA

MELLONICS

Mellonics Information Center in Canoga Park needs IMS Professionals to perform many functions -- redesign new multi-company IMS systems and other related business systems - maintain and modify IMS internals - in an ever expanding state-of-the-art environment.

Located freeway-close in the West San Fernando Valley, MIC has built a nation-wide reputation on delivering cost effective data processing services to customers who span the many functions of modern business. We offer a rare blend of a relaxed, friendly atmosphere and exciting, innovative job assignments.

If you are interested in joining an aggressive, growing organization with an unlimited scope for professional growth, send us your resume today!

Professional Employment

Litton
MELLONICS INFORMATION CENTER
6701 Varial Ave., Canoga Park, CA 91303
Equal opportunity employer M/F

DEPARTMENT HEAD
DEPARTMENT OF OPERATIONS RESEARCH and INFORMATION SYSTEMS
COLLEGE OF BUSINESS
EASTERN MICHIGAN UNIVERSITY

Responsibilities include administration of twelve (12) faculty members and the department's computer laboratory, as well as developing industrial relationships, promoting professional activities and classroom teaching.

Applicants should have a Ph.D. or D.B.A. and a strong background in computers or operations research in addition to demonstrated research capability, leadership potential, and commitment to teaching excellence. **Salary $32,304 - $47,191,** commensurate with qualifications and experience, plus a comprehensive fringe benefits program. **Starting date: July 1, 1981.**

Completed applications are requested by November 14, 1980; however, the search shall remain open until the position is filled. To be considered for the position a standard application may be obtained and MUST be returned with a resume and three (3) references to:

Eastern Michigan University
Personnel Office
112 C.W. Welch Hall
Ypsilanti, Michigan 48197
(313) 487-3430

Affirmative Action/Equal Opportunity Employer and Educational Institution

Apply yourself at National Advanced Systems.

At National Advanced Systems, we're looking for talented computer professionals with the energy and initiative to fully utilize their technical expertise in advancing their careers. And, as a dynamic young company, we can provide just the right kind of environment for career advancement — one that encourages and rewards individual achievements.

So take the first step in proving your initiative. **Apply yourself by calling Ursula Shepherd toll-free at (800) 227-1930, to discuss these immediate openings:**

Systems Support Representatives

We need self motivated individuals to consult and provide technical support to field sales and marketing. Candidates must be able to write and present technical materials and be knowledgeable in the internals of IBM virtual operating systems (MVS, SVS, VS1, VM or DOS/VS). College degree or equivalent experience is required. Openings are available in Tampa, Los Angeles and points in between.

Field Engineers

If you have the skills and ability to excell in field engineering, you'll be recognized for it at National Advanced Systems. We have field engineering openings nationwide which require an AA degree in electronics or equivalent military experience on IBM 370/158 or larger CPUs or associated peripherals experience.

Field Support Representatives

These positions offer the opportunity for people with a dynamic approach to problem solving to resolve problems in customer systems software, provide an interface between the support organization and IBM, assist field engineering with problem determination, and assist systems support representatives in running benchmarks. Candidates must be experienced in problem solving with systems control programming.

If you can't call, send a letter of inquiry or a resume to Ursula at National Advanced Systems, 3145 Porter Drive, Palo Alto, CA 94304. We are an affirmative action/equal opportunity employer m/f/h.

National Advanced Systems

A Subsidiary of National Semiconductor

COMPUTER PROFESSIONALS

L.D. Schreiber Cheese Company Inc., a fast growing national, private label food manufacturing company with sales in excess of $500,000 per year, is rapidly expanding the corporate data processing staff to meet the needs of the 80's.

We offer challenging opportunities in an expanding on-line data base environment for experienced:

- **PROGRAMMER/ANALYSTS**
- **DATABASE ADMINISTRATORS**
- **SYSTEMS PROGRAMMERS**
- **MANUFACTURING DATABASE MANAGERS**

These positions require a BS degree or the equivalent, plus several years experience.

Currently we are running a 370/148 under VM with CMS, SCRIPT/370, RSCS, and QBE with a 4341 on order. The on-line database portion consists of OS/VS1, IMS, CICS and DMS. We are establishing a local and nationwide network of the latest teleprocessing hardware.

We can assure a future filled with growth, opportunity and challenge by sending your resume and current earnings to:

Corporate Staffing Director

L.D. SCHREIBER CHEESE CO. INC.

P.O. BOX 610

Green Bay, WI 54305

Equal Opportunity Employer M/F

playtex

EDP PROFESSIONALS

Advanced automation and MIS have helped us become world famous . . . bring your skills to a company that appreciates and rewards innovation in every area of our business.

MIS | ENGINEERING | MANUFACTURING | MARKETING | SALES | INVENTORY | DISTRIBUTION | FINANCE

International Playtex, Inc. is an expanding, technically progressive organization, a major subsidiary of the $6-billion Esmark Corporation. We constantly search for and apply the latest and most efficient means for manufacturing and marketing our world famous lines of intimate apparel and family products.

Computer applications will continue to play a central role in our success. Those who join us will discover a professional environment and team approach that promotes broadened technical exposure and significant career advancement.

Our location permits our employees to live in relaxed suburban-to-rural communities where housing costs are low and the tax picture is quite favorable. In addition, we are close to some of the nation's finest recreation areas (Chesapeake Bay/Delaware Bay) and have ready access to several major metropolitan areas. Relocation will be assisted (including reimbursement of realtor's commission on the sale of your home).

SENIOR PROGRAMMER/ANALYST — MARKETING & SALES

Lead a project team in developing and/or enhancing interactive decision support systems for our Marketing and Sales divisions. Responsibilities include systems analysis and translation of requirements into logical, economical and practical systems designs. Also preparation of detailed specifications, including interface and data-movement diagrams, formats of files and reports, computer resources requirements and documentation.

Requires at least 5 years solid experience as a programmer/analyst or systems analyst, as well as bachelor's degree, preferably in Computer Science or Business Administration specializing in marketing/sales. MBA a plus.

PROGRAMMER/ANALYST — MARKETING & SALES

As a project team member, you'll develop and implement interactive decision support systems for our Marketing and Sales divisions. Responsibilities will include preparing detail program specifications, designing and testing program logic, coding and installing programs in computer operations. You'll also assist in system analysis and translation of requirements into logical, economical and practical system design.

Requires bachelors degree or equivalent preferably in Computer Science or Business Administration specializing in marketing/sales plus at least 3 solid years as a programmer or programmer/analyst.

Both of the above positions require excelletn command of COBOL, and working knowledge of statistics. IBM background with knowledge of MVS, JCL, TSO/SPF, FOCUS or Ramis, and programmable TSO CLIST preferred. Background in a consumer products business and/or a marketing/sales development function a plus.

SENIOR PROGRAMMER/ANALYST — INVENTORY & DISTRIBUTION

Initial assignment will be to support development/implementation of an inventory management system. You'll then develop a practical, economical warehouse control system. Will work with users to optimize control and data security as well as efficiency of resource usage. You'll also design forms and reports, data-collection procedures, high level control logic modules and system documentation, as well as providing technical leadership to other MIS team members.

Requires BSCS or equivalent, at least 5 years of directly applicable experience, at least 2 or 3 of which must be in the use of COBOL for development of IMS/Teleprocessing/Batch processing.

PROGRAMMER/ANALYST — INVENTORY & DISTRIBUTION

As a project team member, you'll develop and implement phases of an inventory management system. Responsibilities will include preparing detail program specifications, designing and testing program logic, coding and installing programs in computer operations. Following this system development will then proceed in the area of warehouse control systems design.

Requires BSCS or equivalent and at least 3 solid years as a programmer or programmer analyst with use of COBOL for development of IMS/Teleprocessing/Batch processing systems.

To arrange for a personal confidential interview, please call (302) 674-6133 COLLECT, or mail your resume, including salary history, to Paulette Peterson, Recruiting Manager:

International Playtex, Inc.

Box 631, Dover, Delaware 19901

An Equal Opportunity Employer M/F

PROGRAMMER/ANALYST

Req. 6 mth. training and two years experience in planning, producing and documenting standard application software under COBOL and BASIC and the development of utilities under Assembler. Experience in installing minicomputers and troubleshooting of hard- and software is also required. 40 hr/week, AC office, 1200$/mth. **Contact ENSIGN COMPUTER, 444 S STATE, SLC, UTAH 84111/(801) 531-0085.**

Ariz./Calif./Texas

SCIENTIFIC PROGRAMMERS

All Fees Paid $15-$35,000

If you have a BSEE, BSCS, BS in Physics or equivalent, we have many openings in Arizona, California, Texas, and Florida.

Your name, resume & present employer will not be given out without your permission.

For sincere personal service, please send a confidential resume to:

Dan Pullman — (602) 274-5668

PULLMAN PERSONNEL

3003 N. Central, Suite 1706
Phoenix, AZ 85012

Ariz./Calif./Texas

BUSINESS PROGRAMMERS

All Fees Paid $15-$30,000

Prog/Anal/Systems
Data Base
BAL/COBOL/ASSEM/FORTRAN
CICS/DOS/IMS/NYS/JES II

"One to One" Service. Many openings in Arizona, California, Texas, and Florida. Your name & present employer will not be given out without your permission.

If you want to talk about your future, send us a confidential resume at no obligation. We won't waste your time.

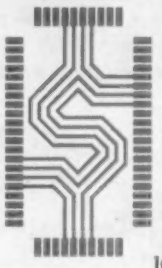
Dan Pullman — (602) 274-5668

PULLMAN PERSONNEL

3003 N. Central, Suite 1706
Phoenix, AZ 85012

SNA Systems Programmers

Bank of America is expanding the capabilities of its large network of branch computing facilities. We are seeking top professionals to play a leading role in this effort.



The network will be SNA with Multiple system/370 IMS host systems. You will develop software for over 1000 remote computers. The terminals include 10,000 CRT's and an expanding network of Automated Teller Machines (ATM). Programmable controllers are employed.

You should have a broad background in these areas:

- Communications programming for SNA/IMS
- System generation problems/ solutions
- Maintenance of software for multiple systems
- Mini-computer environments
- MACRO-11, PL/1, COBOL, Pascal

Specific knowledge of at least one of the following is required:

- SNA (IMS-SLU-P)
- Bunker Ramo Banktran, ATM
- IBM 3600, 8100
- Burroughs CP9500, NDL, MCS

A B.S. Computer Science will be considered a plus. Salary will be commensurate with your experience. Benefits are excellent. You will work in metropolitan San Francisco which offers a wide range of cultural and recreational activities.

If this opportunity interests you, please send your resume and salary history to Bank of America, Charles B. Smith, Dept. 3411N, P.O. Box 37000, San Francisco, Ca 94137. We are an equal opportunity employer.

BANK OF AMERICA

BANK OF AMERICA NT & SA
MEMBER FDIC

MARKETING REPRESENTATIVES

Rapidata, a leader in providing computerized services to Fortune 1000 corporations, has openings for experienced sales people in NEW YORK CITY, BOSTON, ATLANTA, DALLAS and LOS ANGELES. Our rapid growth and expanding product line requires us to seek successful individuals with 3 plus years experience selling remote access computer services, primarily in the financial applications area.

Rapidata offers attractive compensation packages for these positions, including base salaries, performance oriented incentives and full benefits including 100% tuition refund program and employee stock purchase plan.

To learn more about Rapidata and career opportunities in sales call **Howard Turbowitz, Coordinator, Professional Recruiting, (201) 227-6036,** or forward your resume including salary history and requirements to: **Rapidata Inc., 20 New Dutch Lane, Fairfield, New Jersey 07006.**

Moving toward tomorrow, today

an equal opportunity employer m/f

rapidata

SALES/SERVICE DATA PROCESSING

Account Managers/ Account Representatives

• Cleveland • Connecticut • Minneapolis • New York • Philadelphia

We can offer the real D.P. sales/service "pro" the rewards and growth that most people in the business only dream about. SIS is an independently operating subsidiary of Sun Company, Inc. and has grown into the top 1% of all D.P. service firms in size.

We have multiple openings available for D.P. sales professionals with an extensive knowledge of the D.P., telecommunications and computer service marketplace with an established record in the D.P. sales field. Must be an excellent communicator. Some supervisory skill a real plus.

Responsibilities will encompass finding, screening and securing new accounts, the development of formal proposals and the negotiation of sales contracts, operating/service agreements and other legal documents.

We offer an excellent salary and commission plan, a full range of company paid benefits and unlimited advancement opportunity. Send your resume, including salary requirements to: HUMAN RESOURCES DEPARTMENT, SUN INFORMATION SERVICES COMPANY, CW, P.O. Box 13912, Philadelphia, Pa. 19101. An Equal Opportunity Employer, M/F.

Sun INFORMATION SERVICES COMPANY

SCIENTIFIC PROGRAMMER/ ANALYST

Airborne geophysical and photogrammetry firm has opening for experienced FORTRAN and assembler Scientific Programmer/Analyst. Position involves developing and maintaining programs dealing with geophysical processing, digital graphics, and HP 21 MX mini computer systems. Minimum of 3 years programming experience and scientific degree required. Qualified applicants send resume and salary requirement.

AERO SERVICE
P. O. Box 1939
Houston, Texas 77001

EOE M/F

data processing

SENIOR SYSTEMS PROGRAMMER

Red Lobster Inns of America currently has a challenging position available for a talented professional in a dual 4341 processor environment operating under VM OS/VSI utilizing CMS for time sharing network.

Candidates must have a Bachelor's Degree, at least 3-5 years experience having responsibility for hardware, software and telecommunication network.

We are offering the successful candidate an excellent salary, full and complete benefits package, plus an Orlando, Florida progressive working environment.

If you qualify, send your resume with salary history to:

Donna Provenzano

Red Lobster
Inns of America
P.O. Box 13330
Orlando, Florida 32859
(800) 327-1048 - TOLL FREE

An Equal Opportunity
Affirmative Action
Employer M/F/H/V

SYSTEMS ADMINISTRATOR

World Vision, an evangelical humanitarian organization, needs a Systems Administrator to lead a small technical support staff responsible for system software installation and maintenance, and application software installation. Requires 5 yrs exp as system analyst, prefer min of 1 yr exp with DEC-SYSTEM-10 or -20.

Send resume to John Miner, World Vision, 919 W. Huntington Dr., Monrovia, CA 91016.

EOE-M/F

PROCEDURES ADMINISTRATOR

Universal-Cyclops Specialty steel Division has an immediate opening at our Division Headquarters for a Procedures Administrator. Candidate should be degreed, or equivalent, and have a minimum of 3 years' of EDP experience in a business environment, and possess strong verbal and written communications skills.

The successful candidate will be involved with the development of EDP Standards, administrative procedures and disaster recovery plans. Knowledge of distributed data processing, COBOL programming, word processing, and EDP job scheduling is desirable, but not required.

For immediate consideration, submit resume, salary history, and expectations, in complete confidence, to:

UNIVERSAL-CYCLOPS SPECIALTY STEEL DIVISION

cyclops CORPORATION

Industrial Relations Department
650 Washington Road
Pittsburgh, PA 15228

An Equal Opportunity Employer M/F

PROGRAMMER/SENIOR ANALYST

Several openings exist in a dynamic group designing and developing state of the art communications.

Knowledge of TANDEM and/or other stack machines is essential.

Telecommunications experience is desirable.

Metro NYC location.

Salary commensurate with qualifications and experience.

Send resume to: **Perpetual Systems, Inc.**
80 Broad St. 30th Floor
New York City, NY. 10004

or call John Ford collect at **(212) 363-3710.**

ROBERT HALF

NO RECESSION HERE!

DAP MANAGER
Fortune 500 sub is seeking mgr. with 3+ yrs. bus. appl. in 370 shop. Growth opportunity. To: $35K

PROGRAMMER/ANALYST
There are many sun belt positions available for 1+ yrs. COBOL/PL1/ RPG/FORTRAN. Exp. prog. Salaries range from $16,000-$30,000.

ROBERT HALF OF LOUISIANA, INC.
135 St. Charles Ave., Suite 1020
New Orleans, Louisiana 70130
(504) 524-3773

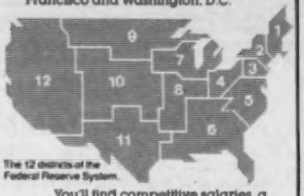
position announcements | position announcements | position announcements | position announcements | position announcements

DATA PROCESSING

Career Perspective in American Banking

The Federal Reserve System. We work so closely with the Government to insure stability in the American banking system, that some people think we're a branch of the Government. Actually, we're not. We're the banks' Bank. We can offer you unique perspective in your career as a computer professional.

If you are an experienced programmer/analyst, systems programmer, data base analyst or a project leader, The Fed has a lot to offer you. To meet our money management goals, we use sophisticated computer applications for everything from pure economic research to electronic funds transfer. The majority of our banks have advanced telecommunications systems using the latest in SNA architecture, state-of-the-art technology (most locations have IBM hardware utilizing IMS or TOTAL/EI) and unique applications development work. Opportunity at The Fed can be found in some of the country's most exciting cities: Boston, New York, Philadelphia, Cleveland, Richmond, Atlanta, Chicago, St. Louis, Minneapolis, Kansas City, Dallas, San Francisco and Washington, D.C.



The 12 districts of the Federal Reserve System.

You'll find competitive salaries, a pay-for-performance merit program, excellent benefits, relocation assistance. And plenty of opportunity for training so you can grow with an organization that's growing to meet complicated economic needs. If you're a computer professional, doesn't it make sense to put your career in perspective with The Federal Reserve System? Call our toll-free number 1-800-821-7700, ext. 103 (in Missouri call 1-800-892-7655) and we'll send you more information. Or, if you prefer, you may send your resume to The Federal Reserve System-DP, P.O. Box 7702, San Francisco, CA 94120. The Federal Reserve System is an equal opportunity employer.

Federal Reserve System

We're Computer Horizons Corp.

A National Data Processing Services Corp.

WE'VE MADE OUR MOVE-NOW IT'S YOUR TURN!!!



We're one of the foremost national, publicly held computer service organizations in the United States. WE have grown at unprecendented rate by providing fast, efficient technical services to major Fortune 500 type corporations.

These services include EDP management consulting, systems analysis and design and programming support. CHC's technical staff, has developed and implemented On-Line systems, as well as major commercial batch systems.

Due to continuing growth and recent staff promotions, Computer Horizons Corp. is seeking to increase our already existing staff in New York, New Jersey, Chicago, Miami, Houston, Oklahoma and San Francisco with EDP professionals who:

1. Have a strong drive to succeed
2. Have the ability to interact with top level management while handling complex assignments for our client companies.
3. Enjoy the challenge that new assignments offer every 4-6 months.

We are currently seeking professionals for any of the above locations mentioned that possess experience with any major manufacturer's hardware. As a plus, if you have also had experience in any of the following areas, we are willing to PAY PREMIUM SALARIES, as well as relocation expenses.

IF YOU ARE A:

PROJECT LEADER or SYSTEMS ANALYST

with extensive experience communicating effectively in user environments, coupled with heavy systems analysis and design skills. Prior programming experience is necessary.

PROGRAMMER/ANALYST

with experience in CICS or IMS

PROGRAMMER

with 2 or more years experience on IBM System 370 with OS or DOS utilizing COBOL, BAL, FORTRAN, PL/1, MARK IV or a

MINI COMPUTER PROGRAMMER ANALYST or PROGRAMMER

with experience in PRIME, UNIX or BASIC or any relevant mini experience

WE WANT TO MEET YOU!!

CHC offers above average salaries, a complete benefits package, tuition refund, life insurance, major medical technical training classes and unlimited opportunity for both financial and technical growth to qualified candidates.

If you would like to expand your movement and diversity with a career oriented data processing company, or simply relocate to another part of the country, please send resume to:

Mr. David Reingold, National Recruiting Director
or CALL COLLECT (212) 371-9600

COMPUTER HORIZONS CORP.

747 Third Avenue, New York, NY 10017

An Equal Opportunity Employer M/F

TURN YOUR CAREER AROUND!

PROGRAMMER/ANALYSTS

INFORMATICS, INC., one of the nation's largest independent suppliers of consulting and programming services, is continuing to expand in TEXAS. We are seeking career oriented individuals who want to be a part of our professional staff and have one (1) or more year's experience in at least one of the following disciplines:

LANGUAGE
COBOL
ALC
PL/1

SOFTWARE
IMS
CICS
MARK IV

HARDWARE
IBM 370, 303X
MINIS

DATA BASE MANAGEMENT

DISTRIBUTED DATA PROCESSING

Our opportunities for client exposure, diversified career development, and long term professional growth are unequaled. We offer excellent salaries, paid overtime, relocation reimbursement, revenue-sharing bonuses, and a comprehensive benefits package, including dental insurance. Send resume in confidence to the location of your choice.

INFORMATICS, INC.

10300 N. Central Expwy., Building II, Suite 167
Dallas, Texas 75231 (214) 696-1900

2900 North Loop West, Suite 1300
Houston, Texas 77092 (713) 680-2100

informatics inc
Professional Services Operations West
Equal Opportunity Employer M/F

FACULTY POSITION IN COMPUTER SCIENCE
KUTZTOWN STATE COLLEGE

Assistant or Associate Professor in Computer Science. Tenure track starting January 1981. Ph.D. in Computer Science or related area; masters with exceptional qualifications considered. Teaching industrial and/or business experience required. Must be able to service upper-division courses and assist in continuing development of B.S. program in computer and information science. Salary range $16,000 to $26,000 depending on qualifications. Fully paid life, health, dental, optical insurance. Apply by November 15, 1980 including a resume, curriculum vita and three letters of recommendation to **Dr. Thomas Pinet, Search Committee, Department of Mathematics, Kutztown State College, Kutztown, PA 19530. AN EQUAL OPPORTUNITY AFFIRMATIVE ACTION EMPLOYER.**

We are seeking to fill
495 EDP Job Openings in the San Francisco Bay Area

You'll find little evidence of recession in the computer careers market in the San Francisco Bay Area. Growth continues at a rapid and steady pace, with heavy demand at all levels for qualified EDP personnel. Our client companies pay all fees, interview and relocation expenses.

The Computer Resources Group, Inc., is a long-established (9 years), highly respected (150 leading companies utilize our services), and alert organization (our data bank of computer professional needs is unmatched in the San Francisco area).

Send us your resume today or call collect.

COMPUTER RESOURCES GROUP INC.

303 Sacramento Street, San Francisco, CA 94111
(415) 398-3535 or 3333 Bowers Avenue, Suite 130
Santa Clara, CA 95051 (408) 727-1658

AFFILIATES IN 25 MAJOR U.S. CITIES

An employer-retained professional placement service

position announcements | position announcements | position announcements | position announcements | position announcements

SOFTWARE PROFESSIONALS

Some of New England's finest companies rely heavily on E.P. Reardon Associates to assist them in finding software professionals. Two of our clients have expressed an urgent need for talented software engineers with the qualifications listed below:

SOFTWARE MANAGER — **To 55K**

Will manage a variety of 10-12 man projects involving the design, development, installation and maintenance of real time transaction processing system. Previous experience in multi-user data communication environment essential.

MANAGER - PRODUCT DESIGN — **To 45K**

Will be responsible for development of all systems software for DDP System, Operating Systems, and Utilities. Demonstrated management experience in these areas required.

SR. SOFTWARE ENGINEER - PDP11 — **To 30K**

Will assume lead technical role in small software group responsible for systems design, RSX-11M operating systems knowledge is essential. Experience with networking, I/O drives, diagnostics or other areas helpful. New facility, unlimited machine availability, competitive salary and benefits.

If you are qualified and interested contact Dan Meagher, by calling (617) 329-2660. For your convenience we will be receiving calls until 8 PM on October 6th-8th. If you prefer, you are invited to mail your resume (in complete confidence) to:

E.P. Reardon Associates
888 Washington Street
Dedham, MA 02026

Programmer/ Analyst

Our expanding Data Processing Department offers an opportunity for a career-oriented data processing professional to play a key role in meeting future objectives. Responsibilities include design and programming, analysis and contact with user departments for systems support.

Applicants should have at least 3 years COBOL experience in commercial applications. Experience with Burroughs 1800/1900 systems in an on-line data base environment using DIS, DMS II, GEMCOS TOTAL, NDL, ODESY, CANDE, and REPORTER II is preferable.

Send resume with work history and salary requirements to:

John Camisa

Merrell

P.O. Box 71, Hightstown, N.J. 08520
Or call him at (609) 448-3000 Ext. 259

AGENCIES NEED NOT APPLY
equal opportunity employer m/f

SENIOR PROGRAMMER

McGraw Edison has an immediate and rewarding opportunity for an individual with 2-5 years experience on IBM 370/303 processor with knowledge of OS/MVS, JCL, IMS, TSO, and COBOL.

If selected for this opportunity, your principle area of activity will be the installation and maintenance of computer assisted planning and control systems.

Our benefits package includes company-paid health, hospitalization, life and dental insurance plus major medical, tuition reimbursement, and outstanding profit sharing programs. **For immediate consideration, forward your resume, in confidence, to: F.B. Zediak, Personnel Manager, or call: 614/452-8411.**

McGRAW-EDISON

Power Systems Group
P.O. Box 1510
Zanesville, OH 43701

An Equal Opportunity Employer M/F

ASSOCIATE PROFESSOR COMPUTER SCIENCE

Growing Community College, located in a beautiful, rural suburb of Atlantic City, N.J. is seeking an individual who can develop and plan a Computer Science Program, relevant to the needs of private business and public agencies.

Bachelor's Degree Required, MBA or Master's in Teaching preferred. Experience in both teaching and the business applications of computers is desired. An in-depth knowledge of COBAL, and RPG required.

Salary to $26,000 to start. Send resume by Wednesday, Oct. 22, 1980 to: Director of Personnel, ATLANTIC COMMUNITY COLLEGE, May's Landing, N.J. 08330. An Equal Opportunity/Affirmative Action Employer.

SELECTED OPENINGS

New England - Texas
Florida - Midwest

We recruit for GROWTH LEADERS with EDP VIGOR.

They value GOOD EDP and ENGINEERING folk, and pay all fees.

SELECTIVE RECRUITING ASSOCIATES
3001 S. State St.
Ann Arbor, Michigan 48104
Phone: 313-994-5632
(Mail or collect calls to C.W. Page)

APPLICATION PROGRAMMERS

Positions available for individuals who have 2 years or more practical work experience as a COBOL programmer. Applicants should have a financial programming background. We offer excellent benefits and competitive salary. Mail confidential resume including salary history and salary requirements to Denise Carpenter, Personnel Interviewer.

THE BROADVIEW SAVINGS & LOAN CO.
4221 Pearl Rd.
Cleveland, OH 44109
Equal opportunity employer m/f/h/v

MAJOR EXPANSION

Nationally known investment advisor is seeking qualified programmers to assist in installing a new financial data base.

SENIOR COBOL PROGRAMMERS —
2-5 years experience required; DOS/VS & DBMS useful.

FORTRAN PROGRAMMERS —
1-2 years experience for commercial computing R&D position.

JUNIOR SYSTEM PROGRAMMER —
BAL & DOS/JCL required.

Salaries commensurate with experience

Reply in confidence to the Personnel Department

Wright Investors' Service
10 Middle Street
Bridgeport, Ct. 06604

PROGRAMMER ANALYSTS (B3800)

DMS-II, FORTE/2, NDL
B874 COBOL 74/68
SRI/EDIT
PCC NEEDS HIGHLY EXPERIENCED PERSONS IN ANY OR ALL OF THE ABOVE

We are looking for strong leaders for our Applications Team and our Data Base/Data Comm. Team. We also need a Programmer Analyst II to support our business and financial software. Salary is commensurate with experience to $30,000.
PCC provides excellent benefits and challenging work in an ever changing environment. Position open until filled. For additional information, call Jim Tuedio or Jim Budelman

213/578-7374
Office of Personnel Services
PASADENA CITY COLLEGE
1570 E. Colorado Blvd.
Pasadena, CA 91106
(213) 578-7388
EOE/AA

PROGRAMMER/PILOT

RPG II, System 34, System 3 experience. Florida based company. Corporate multi and single engine aircraft. Code when not in air. Excellent starting salary and benefits.

Contact Mr. Laskey
Dynamic Control Corp.
Coral Gables, FL
305/444-6524

SYSTEMS PROGRAMMING SUPERVISOR

The Computer Center at the University of California Santa Cruz offers an exciting position in a mixed academic/administrative environment. Working supervisor will be principle IBM OS systems programmer and supervise three programmers responsible for both IBM and UNIX software. Balance between supervisory skills and technical expertise is desired. Requires six years IBM OS systems programming experience with knowledge of hardware, teleprocessing, system generation, PL/1, and assembler. An understanding of and appreciation for user needs is essential.

Position will report to Director of Computing. The hardware environment is an IBM 360/75 (soon to be upgraded to IBM 4341 or equivalent), a VAX 11/780, and 3 PDP 11's. The IBM software is OS/MVT, HASP, and WYLBUR, with VM/VSI and a teleprocessing monitor in the future. The Minicomputer software is a networked UNIX.

Attractive working environment in terms of organization size, university setting, beautiful community with clean air, and numerous recreational and cultural amenities. Salary range $2,644 - $3,197 plus excellent university benefits.

Apply to USCS, Personnel Office, 1156 High Street, Santa Cruz, CA 95064 no later than 10/17/80. An EOE

UNIVERSITY OF CALIFORNIA
SANTA CRUZ

position announcements | position announcements | position announcements | position announcements | position announcements

DATA PROCESSING MANAGER

Sacramento

Fast growing mortgage loan brokerage and servicing firm is seeking an aggressive individual to manage all aspects of data processing operations and systems development. Candidate must have 3-5 years' experience in data processing with 1-2 years' experience in a Fortran-based Hewlett Packard 3000 environment utilizing the IMAGE Data Base Management System.

Salary is commensurate with background and experience. Excellent fringe benefits, and very desirable location.

Send complete resume and salary history to

CW Box 2405
375 Cochituate Rd., Rte 30
Framingham, MA 01701

Information Systems - Senior Consultant.

Five years experience; proven ability to work effectively in overseas situations, especially within developing country environments. Responsibilities include consulting to major corporations in Europe and Latin America and to domestic corporations with international operations on issues related to the organization and strategies of very large-scale data processing activities. The work will be performed both in the U.S. and abroad. Consulting activities involve providing data processing and financial evaluations, feasibility studies and strategy analyses to the above mentioned clients. The work will focus on managing and performing studies on organizational relationships, data processing strategy, and consulting on the design of management information systems. Salary $45,500 annually. 40 hours/week.

Send resume to Ellen Hayes, Arthur D. Little, Inc., 20 Acorn Park, Cambridge, MA 02140.

An equal opportunity employer, M/F.

EDP AUDITOR

National and well established Bonding and Insurance Company offers a career opportunity in the Home Office located in downtown Baltimore. Essential qualifications are: 2 or more years experience in EDP Auditing and the ability to evaluate in an IBM 370/138 DOS/VS environment, using Cobol and ALC. Degree preferred.

Comprehensive compensation & an excellent benefit program including dental insurance and tuition reimbursement. For confidential consideration, forward your resume and salary requirement to: **Employment Division, Fidelity and Deposit Co. of Maryland, 215 N. Charles St., Baltimore, MD 21203**

AFFIRMATIVE ACTION EMPLOYER

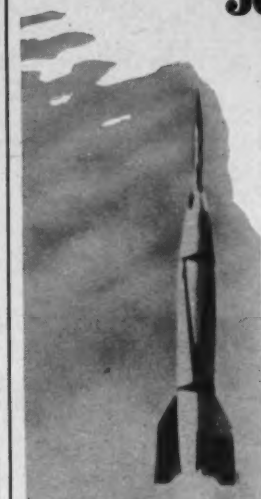
FACULTY POSITION IN COMPUTER SCIENCE

Applications invited for tenure-track full-time undergraduate teaching position in computer science, starting Jan. or Aug. 1981. Masters degree in computer science required; Ph.D. in computer science preferred; business/industrial experience desirable. Rank and salary based on experience and qualifications, up to $30,340.00, plus excellent benefits. Applications accepted until position is filled. **Send vita, unofficial transcripts, and letters of recommendation to Dr. A.R. Patel, Chairman, Computer Science Search Committee, Lock Haven State College, Lock Haven, Pennsylvania 17745.**

An affirmative action, equal opportunity employer.

Systems Analysts/Software Engineers/Programmers

Join the first U.S. space contractor and help make software history.



In 1944 General Electric received a U.S. Army contract to research and develop long-range guided rocket vehicles—and became the nation's first space contractor. Then came the first heavy rocket launch in the U.S. . . . the first phase-comparison system for rocket vehicle guidance . . . the successful launch of the first rocket vehicle from Cape Canaveral (shown here), and a lot more GE history you'd find interesting.

Even more interesting are your opportunities to make history with us—no exaggeration considering the nature and diversity of software projects in the GE Space Systems Division.

We develop and provide software and data systems as *products* . . . and nowhere in industry or government will you find software products using more advanced or innovative technology. The complex systems architecture problems we're tackling call for non-standard solutions.

Some 35% of our business consists of software and data systems—and it's one of our fastest growing areas. Our R&D program in software technology and our training program for software professionals tell you the depth of our commitment.

Every position here offers the chance to make highly visible individual contributions. We have openings at various experience levels for:

- **Software Analysts**
- **Senior Software Analysts**
- **Advanced Software Analysts**
- **Systems Software Analysts**
- **Electronic Digital Hardware Design & Development Engineers**
- **Ground Systems Engineer**
- **Data Systems Engineer**
- **Data Base Systems Engineers**
- **Image Data Systems Engineers**
- **Software Support Service Engineers**

For immediate consideration, send your resume to: Mr. W. E. Sarno, Dept. #VF-48-G, General Electric Space Division, Valley Forge Space Center, Goddard Boulevard, King of Prussia, PA 19406.

GENERAL ELECTRIC

GE takes pride in being an equal opportunity employer, m/f



Computer Specialists

Computers are a Results Oriented Business

In today's inflationary economy where so many pressures exist to cut costs, very often we forget that experience counts more when the going gets tough. We currently have several positions available for individuals with proven track records.

Jobs range from **Systems Software Specialists** to **Design Engineer**, to **First Line Managers** to **Applications Programmers (scientific, commercial, real time)**, and **advanced R & D Specialist**.

Several new technology thresholds are now available for the committed specialists.

Openings are National and International — all industries. No promises — just action. What you want to do counts.

CALL OR WRITE BILL COLLEN (512) 340-3666

Suite 306 GPM SO. TOWER
800 NW Loop 410
San Antonio, TX 78216
Company Fee Paid

Compute R career resources

Eleven years of career specializing — Seven years of computing experience Independent Associates Nationwide

---

SALES HEAVYWEIGHTS

Los Angeles Area

We are a major computer services company, a division of a Fortune 300 company. We are looking for highly motivated, experienced marketing representatives who know the "pluses" of a large state-of-the-art environment and are able to sell it to new and existing accounts in the private and government sectors.

You must be familiar with selling timesharing, remote batch and data management systems, and have at least 5 years related experience in sales and sales support. A degree in Computer Sciences is preferred, or equivalent technical experience, and familiarity with government and commercial accounts in the Los Angeles area.

If you are interested in joining an aggressive growing organization with unlimited scope for professional growth, send us your resume today!

CW Box 2407
375 Cochituate Rd., Rte. 30
Framingham, MA 01701

An equal opportunity employer M/F

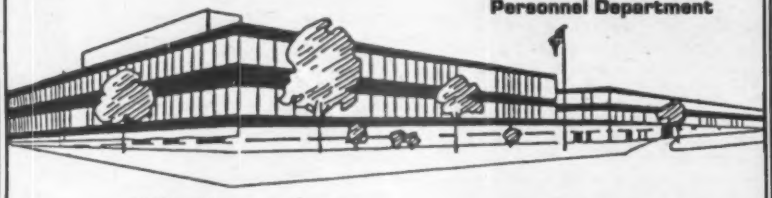
SENIOR PROGRAMMER-ANALYSTS
Medical Research

WYETH LABORATORIES, a leading pharmaceutical firm, is expanding its staff of senior programmer-analysts working in support of developing new drugs. Additional positions are now available with our Scientific Computer Applications Division in Radnor, a highly attractive Main-Line Suburb of Philadelphia.

Responsibilities of these positions will emphasize computer programming and analysis for supporting clinical trials of experimental new drugs. Applicants must be ***results-oriented*** with at least several years of experience. Demonstrated proficiency in higher-level programming languages and computer systems analysis is essential. A mathematically-oriented education (preferably Master's level), and project leadership potential, are desirable. Applications will involve processing medical and other scientific data, with emphasis on PL/I, and will heavily utilize many "commercial" programming techniques relating to the organization and management of large files.

These positions offer excellent starting salaries and include an attractive package of fringe benefits. Qualified individuals are invited to apply by forwarding a resume to:

John Pinkerton
Personnel Department



Wyeth

WYETH LABORATORIES, INC.
P.O. Box 8299 Philadelphia, PA 19101

An Equal Opportunity Employer M/F/H

Software Marketing Representatives

Rewarding openings with **VCI** *in New York City area...Mid-Atlantic and Southeastern States...Southern California/Denver/St. Louis areas.*

Successful D.P. sales experience a must!

Value Computing Incorporated, a proven leader in the development and marketing of data processing operations software systems, is expanding its marketing force nationally. *Direct sales positions are immediately available to aggressive, self-motivated professionals with successful D.P. sales experience. Knowledge of IBM hardware is highly desirable.*

You'll do a moderate amount of travel within your territory...and advancement potential within our dynamic, fast-growing organization is excellent. **Anticipated 1st year earnings: 35K plus.**

Basically, we're seeking ambitious individuals who will be well-compensated for their performance (salary plus commission plus bonus). Don't pass up this opportunity to maximize your income! Send your detailed resume (including earnings history), in complete confidence, to: **Mr. Jay H. Levine...Vice President-Sales, Value Computing Incorporated, 300 VCI Bldg., West Marlton Pike, Cherry Hill, NJ 08002.** *Equal opportunity employer.*

VCI

Data Processing

Research & Development

As a result of outstanding growth and the opening of new Data Processing Divisions, Lanier, a leader in the office equipment industry, has a number of new openings.

We offer professional challenge, excellent compensation, full benefits and career advancement. You will be working in a pleasant, modern facility in the highly desirable Atlanta area.

Communications

Software Engineers with minimum of 2-3 years experience in IBM protocol emulations. Familiarity with Bisync, SDLC and TTY, 2770, 3780, 3270 emulations important.

Software Programmers

Computer Science or related degree plus Assembly language experience.

DBMS

Software Engineers with minimum 3 years experience in design and implementation of DBM on small machines.

Accounting Systems Project Leader

BS or MS in Computer Science plus five years experience in programming accounting software, preferably with a software vendor.

Test Engineer

Electrical Engineer with 2 years test engineering experience. Involves hardware and test software. Experience with TEMPEST, UL, FCC requirements desirable.

If you feel you qualify, call JOHN HEGARTY COLLECT at (404) 329-8000 or send resume to:

LANIER BUSINESS PRODUCTS
1700 Chantilly Drive N.E.
Atlanta, Ga. 30324

LANIER®
LANIER BUSINESS PRODUCTS, INC.

Equal Opportunity Employer M/F

SR SYSTEMS ANALYST TO $27,000

Local mfg seeks professional to develop diversified mfg systems. Will be responsible for user definition thru project management and implementation. No programming required, but must have programming background and experience with mfg systems in order entry, job cost scheduling and production planning. Atlanta suburbs, excellent benefits.

SR ANALYST TO $32,000+

Leading computer vendor specializing in the "on line" segment of the market seeks individual to work in a pre & post sales environment. Individual will work with both hard & software, running benchmarks, evaluating performance and assisting customer with support plus experience with "front-ends" and 16 bit Processors. This is an extremely technical position offering unlimited growth and earnings potential.

TECH SUPPORT TO $30,000

Major consulting firm has created a new & challenging position. They seek an individual who will work closely with their DP clients evaluating operations systems as a "sounding board" in all technical aspects including performance measurement tools. Requires 5+ yrs IBM environment and strong background in tech support. Ideal position for Systems Programmer who wants out of large shop environment. Excellent growth potential.

Client co's pay all costs. For more information on the above positions, contact **Ron Spang, 404/393-0933** or send resume in confidence including current salary to **FOX-MORRIS PERSONNEL CONSULTANTS, 47 Perimeter Center East, NE, Atlanta, GA 30346.**

Syst. Analyst IMS data base CICS COBOL — to 31K
Oper. Mgr. with large Burroughs or Honeywell — to 28K
Systems Analyst with MRP set-up — to 27K
Programmer/Analyst RPG II $3 — 15 D CCP BOMP — to 26K
Programmer/Analyst COBOL CICS data base — to 25K
Programmer IBM OS/VS CICS — to 22K
Programmer Honeywell level 6 — to 21K
Programmer RPG II BAL — to 21K

These are only a few of the positions open through our divisions. To find out about these and other opportunities, contact the controlling office in your region of interest. All positions are fee paid.

O-R-T-U-N-E personnel Data Processing Divisions

Southeast: 3710 Landmark Dr., Ste. 201, Columbia, SC 29204, (803) 782-2700
Southwest: 12860 Hillcrest Rd., Ste. 123, Dallas, TX 75230, (214) 661-2088
Northeast: 999 Asylum Ave., Hartford, CT 06105, (203) 522-1176
Northwest: 2200-6th Ave., Ste. 539, Seattle, WA 98121, (206) 682-0911
Far West: 1451 River Park, Sacramento, CA 95815, (916) 920-5560
Mid West: 307 4th Ave., Ste. 505, Pittsburgh, PA, 15222, (412) 261-6660

Equal Opportunity Employer M/F

SENIOR SYSTEMS ANALYST PROGRAMMER (CERRITOS COLLEGE)
DEC SYS/10 COMPUTER CTR

SALARY: $1887 - $2293 per mo., + college pays for family medical/dental benifits. HOURS: 40 hour workweek, hours are flexible. QUALIF: Comb equiv 2 yrs college training in EDP + 2 yrs exp. in programming, incl. knowledge & exp. in use of COBOL language. FINAL FILING: OCTOBER 22, 1980. For Application & Info Contact:

PERSONNEL OFFICE
CERRITOS COLLEGE
11110 E. Alondra Blvd., Norwalk, CA 90650
(213) 860-2451, Ext. 269

THIS SPACE FOR HIRE.

[Inquire at Classified Advertising Dept.]

Tangent International

METROPOLITAN NEW YORK CITY AND SUBURBS

We have multiple openings for talented analysts and programmers. If you have at least four years experience and would like to join a fast track consulting firm with international opportunities, submit your resume in confidence to:

Tangent International Computer Consultants, Inc.
Suite 9807 1 World Trade Center
New York, N.Y. 10048

TELEPHONE: 212/938-0438

PROGRAMMERS

UNIVAC 1108 System, Assembly language and DMS experience preferred. Pleasant working conditions in the heart of the Shenandoah Valley. Liberal salary and benefits. EOE.

Send resume and salary requirements to:

Mr. J.A. Manning
WESTERN UNION TELEGRAPH CO.
P.O. Box 186, Middletown, VA 22645

position announcements | position announcements | position announcements | position announcements | position announcements

EDP SPECIALISTS

career search opportunities-$18,000-$55,000+

DIRECTOR R&D SOFTWARE/HARDWARE to $55,000 PLUS. Attractively located Mid-Atl corp, most advanced & largest in growing field, seeks executive for KEY Tech group of 35+ professionals developing on-line mini-based systems w/multiple custom I/O's. Req's achievements managing software/hardware systems product development. Refer HG.

TELECOMMUNICATIONS EXPERT to $50,000. Large Phila corp seeks applications & technical expert to design & maintain large communications network. Excellent pay & benefits for talented & managerial person. Refer GR.

SYSTEMS MANAGER to $45,000. $250mm specialty leader. Midwest metro. Direct large staff in large state-of-art IBM shop. Financial/Business activity. Degree. Refer AT.

TELECOMMUNICATIONS MGR. to $40,000. Excellent state-of-the-art oppty w/leading firm. Req's experience in satellite, cable, telephone, microwave & broadcast. Refer GR.

DATA BASE ANALYSTS to $40,000. Design, develop & support IMS data bases & support programmers w/consultation, debugging & design assistance. 3-5 yrs exp w/DL/1 applications programming & IMS data base design req'd. Refer NS.

DEVELOPMENT MGR. to $40,000. Leading-edge firm seeks extensive exp in IBM OS/DOS/VS, Teleprocessing & Data Base design. Refer GR.

MANAGER OF SYSTEMS DEVELOPMENT to $38,000. Our client, a multimillion $ div of "Fortuen 500", seeks solid professional to assume responsibility for divisional planning & development of business systems & computer systems interface w/ other div's. Related exp in an IBM environment using IDMS & on-line CICS. Supervise up to 60 people in multi-site environment. Refer BS.

CONSULTANT INTERACTIVE SYSTEMS to $36,000. Use your interpersonal/technical skills in this growing shop. 5+ yrs exp designing interactive systems. DBMS/MVS knowledge req'd. Refer GR.

IMS OR MVS SYSTEMS PROGRAMMER to $36,000. Leading state-of-the-art shop seeks exp in either IMS/VS, DB/DC or OS/MVS/JES 2 w/knowledge of CICS. Refer GR.

CONSULTING, $32,000 +. Major consulting firm seeks individual to act as tech consultant to their DP clients. Req's degree, 5+ yrs exp in operating systems support. New position. Atlanta based. Refer RS.

D.P. PLANNING to $30,000. Major financial holding corp. Develop feasibility & operational technology for new applications. Hardware/software planning. Ohio metro. Degree. Refer AT.

HONEYWELL PROGRAMMER/ANALYST to $30,000. An industry leader in Phila metro area has prime oppty's for GCOS/GMAP exp. Refer GR.

SR. SYSTEMS to $30,000. Billion dollar prestige mfg corp in choice VA location seeks Sr. Analyst w/exp in Financial, Accounting, Payroll or inventory areas. Large 370 OS, COBOL, IMS bkgd a plus. Refer DM.

CONTACT OUR NEAREST OFFICE ABOUT THESE AND OTHER FEE-PAID OPPORTUNITIES. OUR UNIQUE, COMPANY-OWNED OFFICE SYSTEM ASSURES PERSONAL, CONFIDENTIAL SERVICE.

PHILADELPHIA, PA 19102 — S. Burns, 1500 Chestnut St., 215/561-6300
ATLANTA, GA 30346 — R. Spang, 47 Perimeter Center, 404/393-0933
BALTIMORE, MD 21204 — R. Nelson, 409 Washington Ave., 301/296-4500
CHARLOTTE, NC 28226 — J. Schwab, 1742 Southern Nat'l Ctr., 704/375-0800
CLEVELAND, OH 44131 — A. Thomas, 4401 Rockside Road, 216/524-6565
McLEAN, VA 22102 — D. Miller, 1710 Goodridge Drive, 703/790-1335
NEW YORK, NY 10020 — N. Shanahan, 1211 Ave. of the Americas, 212/840-8930
PITTSBURGH, PA 15222 — B. Sayers, 4 Gateway Center, 412/232-0410
PRINCETON, NJ 08540 — G. Romagna, Route #1, CN 6100, 609/452-8135
WILMINGTON, DE 19810 — H. Green, 3516 Silverside Rd., 302/478-5150
HOUSTON, TX 77096 — G. Smith, 3000 Richmond Ave., 713/523-5504
LOS ANGELES, CA 90017 — W. McNicols, 707 Wilshire Boulevard, 213/623-3091
SAN FRANCISCO, CA 94111 — W. McNichols, 601 Montgomery Street, 415/392-4353

fox·morris
personnel consultants

EDP PROFESSIONALS

While exploring the technology at **INFO '80,** discover your **BEST SOURCE FOR CAREERS IN THE 1980's . . . AND VISIT**

Richard Kaye Associates

One of the nation's leading EDP placement firms . . . specializing **EXCLUSIVELY** in **DATA PROCESSING.**



RICHARD KAYE

Currently our group is in possession of more than 4500 legitimate openings! Ranges are from basic technical levels to senior management, at beginning salaries of $25,000-48,000. Many clients offer 3-4 weeks vacation first year, bonuses up to 30% of gross earnings, etc.

Contact one of our professional placement specialists, in the area of your expertise:

-Programming-Systems-Systems Engineering-EDP Education, Audit, Administration, Security-
DICK LEWIS
LARRY CECCARELLI
TOBY MITCHELL
MARYANN VITONE
FRANK QUINN

-Voice/Data Communications-Field Engineering- Hardware-All Telecommunications Areas-
PAUL STOCK
RICK MARTIN

-EDP Operations-
LAUREN ADAMO

Call or visit us any weekday (no appointment necessary for experienced people). Hours: 8:30AM to 7:00PM.

Phone: (212) 661-0777
551 Fifth Avenue, Suite 1125, New York, NY 10176

SYSTEMS/ANALYST

A manufacturing firm in north west Pennsylvania has immediate need for Systems/Analyst. An innovative individual needed to assume responsibility in developing computer systems to solve business problems. Ability to interact with all levels of management is important. Excellent communication skills are essential. BA/BS degree in Business, Finance or related field required. Three years experience in the design and implementation of computer systems built in a DB/DC environment required. Salary is open and company offers an excellent benefits program with relocation. Please forward resume and history of earnings in confidence to:

CW Box 2404
375 Cochituate Rd., Rte 30
Framingham, Ma. 01701

APPLICATION SOFTWARE CONSULTANT

Leading international public accounting and consulting firm seeks an experienced user-installer of large scale IBM 370 general ledger application software. The position is in the World Headquarters software research group in Chicago. Responsibilities include monitoring package status of various vendors, evaluating new packages and releases and assisting our personnel and clients in evaluating and implementing application software.

Candidate should have an MBA or MS in computer science or a bachelor's degree with an accounting major. A minimum of 3-4 years experience in accounting systems including substantial recent package implementation is required. Demonstrated technical skills must be combined with exceptional written and verbal communication skills.

Starting salary will be from mid $20's and up, depending on qualifications plus relocation. An opportunity for rapid advancement exists in our organization, with a full employee benefit plan available.

Respond with qualifications and cover letter to:

CW Box 2398
375 Cochituate Rd., Rte. 30
Framingham, Mass. 01701
An Equal Opportunity Employer

DATA PROCESSING

Feeling Blocked?
Unsure Of Your Future?
Ready For A Change?
Consider Utica National . . .

A major P/C Mutual Insurance Company, now going into LIFE; a stable company with growth on the horizon; a company large enough to offer challenges and small enough to care about you . . . has a unique opening for a:

SUPERVISOR OF PROGRAMMING

Ideal candidates will have a minimum of 5 years experience in programming and systems development. Good communication skills a must. Some supervisory experience desirable but not mandatory.

SYSTEMS ANALYST

We currently require a Systems Analyst to develop complete systems specifications for financial systems. The position will be responsible for planning, managing and controlling systems development activities. Ideal candidates will have experience with development of financial systems, a knowledge of COBOL, and good communication skills.

PROGRAMMER/ PROGRAMMER ANALYST

Consider this excellent opportunity to join an expanding Data Processing Staff implementing a major life insurance system. The right candidate will have a life insurance background and a minimum of two years business programming (assembler language programming a plus).

We offer rapid growth and development potential along with excellent salary, benefits and work environment. If you are interested . . . send resume and salary requirements in strict confidence to:

A.A. Ritchie
Manager — Management Information & Life Systems

UTICA NATIONAL INSURANCE GROUP
1 Utica Mutual Plaza
New Hartford, NY 13413
An equal opportunity employer M/F

LIVE, WORK & PLAY IN

NEW HAMPSHIRE

Enjoy the 4 Seasons
NO State Income Taxes
NO State Sales Taxes

Op'ns Mgr	IBM/OS	Low 30's
Sr. Data Base Anal	IMS/DB	34k
Systems Prog.		34k
Prog Supvr	RPGII	23k
Prog/Anal Ins.	COBOL	23k
Sr. Prog/Anal	COBOL	23k
Systems/Anal	Insur.	22k
Appl. Prog	COBOL	18k

These are just a sample of the many EDP positions available in NH. For consideration, send a resume to David J. Osgood, C.P.C., Vice President at:

availABILITY, INC.
Personnel Consultants • An Exclusively Employer Paid Service

DIRECTOR DATA PROCESSING

New department of Data Processing is being created to support a hospital-wide health information processing system.

We are a progressive 315 bed referral center located in Travers City, Michigan. Due to continued growth we are looking for an individual interested in challenge, opportunity and a satisfying work life to supervise the activities of our newly formed data processing department.

The successful candidate will possess an advanced degree in business and have a minimum of 2 years experience directing the data processing activity in a health institution.

Please send resume including salary history to:

CW Box 2403
375 Cochituate Rd., Rte 30
Framingham, MA 01701

SALES, MARKETING AND MANAGEMENT

Of contract programming services. Must be conversant in hardware and software, primarily for the scientifice and aerospace industry. Salary commensurate with background plus incentive. We are based in Orange County. Mail resumes in confidence to:

Mr. J. Harper
CDI CORPORATION
3303 Harbor Blvd.
Costa Mesa, CA. 92626
or call:
(714) 556-8022
Equal Opportunity Employer M/F

position announcements | position announcements | position announcements | position announcements | position announcements

Systems Professionals

We can not imagine a finer place to work. Our offices, situated on the eastern fringe of Springfield, Massachusetts allow extreme ease of commuting from a nearby, reasonably priced residence. Our continuous, successful growth allows us to offer you steady professional and personal growth in a first class environment, plus a fine package of fringe benefits, competitive wages and annual pay increases.

If your background includes industry work experience with IBM 370 series, DOS/VS, CMS, high proficiency in COBOL, and some college education, you may qualify for these fine growth opportunities within our Corporate Headquarters.

DATA BASE ADMINISTRATOR

Requires IDMS design and implementation experience, along with use of the IDD and background with IBM 370. Prefer at least 6 years MIS experience and BS degree or equivalent.

SYSTEMS ANALYST

Prefer minimum 2 years programming/analyst experience with heavy emphasis on implementing financial reporting systems, particularly general ledger.

Please reply by resume stating salary history to:

Personnel Representative
FRIENDLY
ICE CREAM CORP.
Wilbraham, Massachusetts 01095
Equal Opportunity Employer

Friendly® ICE CREAM CORPORATION

OUR SUPERIOR GROWTH IS YOUR SUPERIOR OPPORTUNITY

COMPOUND your technical talents as a COMPUTER PROFESSIONAL with our dynamically expanding State-of-the-Art IBM/OS environment.

SENIOR PROGRAMMER ANALYSTS

Positions require a minimum of 3 years IBM/OS experience, COBOL and on-line data base to include one year analysis and design.

VM SYSTEMS PROGRAMMER

Requires 3-5 years systems experience in an OS environment, a 1 year minimum VM-Sysgens and maintenance and ALC programming.

SP Communications pays excellent salaries and awards fine benefits. **Contact Marsha Underhill, (415) 692-5600, Ext. 2299, or send resume with salary history to One Adrian Court, P.O. Box 974, Burlingame, CA 94010.** An Equal Opportunity/Affirmative Action Employer.

SPC SPCommunications
a Southern Pacific Subsidiary

PROJECT LEADER

Realistic upper level management potential in near future. 3+ yrs development using COBOL, good oral & written communications skills with heavy documentation experience. Responsibilities include supervision of projects, training users and documentation of systems in 370/148 environment. EXCELLENT benefits. $31,000

COBOL-BAL

Outstanding career position offers profit sharing, tuition refund, 3 weeks vacation, Major Medical and fully paid retirement. 1+ years BAL or COBOL with good interpersonal skills. Excellent growth potential in pleasant working environment. State of Art 370 OS with IMS and CICS. $26,000

HP 3000 FORTRAN

Extraordinary opportunity to aid in conversion from 370 to DUAL HP 3000. Commercial applications include A/R, A/P, PROD SCHED. 2+ yrs FORTRAN programming. Key position with integral responsibilities. $29,000

ALL FEES PAID
ROBERT HALF OF NEW YORK, INC.
522 Fifth Avenue
New York, N.Y. 10036
212-221-6500 (agency)

COSMO DATA SERVICES

Nationwide Positions

Programmers to Project Leaders —
If you aspire to fulfillment in your career we have the knowledge of opportunities from your town to ours. Call us for a CONFIDENTIAL telephone interview.
Toll Free: 800/327-7260
Or in Florida call 1/305/771-9910 collect OR mail your Resume with position and salary requirements to:
Cosmo Data Services
5301 N. Dixie Hwy.
Ft. Lauderdale, FL 33334

JOB HUNTING?

If you are an experienced Programmer Analyst and desire a new position call or write Dr. Renato Civili, The Boston Center for Career Development, Ltd., (617) 367-0727, the placement specialists for computer people.

Many other engineering and technical positions also available.

All fees paid
Boston Center for Career Development Ltd.
6 Faneuil Hall Marketplace
Third Floor
Boston, MA 02108

PROGRAMMER

Requirements: Bachelor's Degree from an accredited college plus 2 years experience in computer programming using COBOL, BASIC, Assembler language or Fortran. It is desirable that applicants have PDP experience. An equivalent combination of training and experience is acceptable. Starting salary: $19,239-$24,543. Resumes should be sent to **Programmer Recruitment, City of Miami, Dept. of Human Resources, P.O. Box 3307078, Miami, FL 33133**

PROGRAMMERS ANALYSTS SYSTEMS ANALYSTS

"Nationwide" openings at many levels and especially for **Programmers, Analysts & Systems Analysts.** We offer the most "individual" job search available today. Our client companies pay all fees. Send your resume in confidence to:
Advanced Research
P.O. Box 3861
Sarasota, FL 33578

SYSTEMS ANALYST II

City of St. Petersburg, Florida
Salary: $17,846 - $23,192

Responsible for evaluation and selection of computer software and hardware and project management related to the installation of the selection. Must have a minimum of 6 years data processing experience, 4 of which is in systems analysis including successful project leader experience. **Submit resume to Employment Section, P.O. Box 2842, St. Petersburg, FL 33731.**

FIELD ENGINEERS

DOCUMATION INCORPORATED, a leading manufacturer of computer I/O subsystems and peripheral equipment, now has excellent opportunities for Field Engineers throughout the United States.

Applicants should possess a knowledge of digital and analog circuitry, plus 1-2 years experience with IBM or Burroughs compatible equipment, especially printers, card punches and card readers.

We offer competitive salary and benefits package, as well as a real growth opportunity that will excite your imagination and challenge your professional expectations. Direct your resume with salary history and geographical preference to: Ed Johnson, Dept. 574.

DOCUMATION INCORPORATED
P.O. Box 1240
Melbourne, Florida 32901.

An Affirmative Action/Equal Opportunity Employer.

DATA PROCESSING PROFESSIONALS

Major S.E. corporation headquartered in Atlanta and affiliated with Alabama, Georgia, Gulf and Mississippi power companies has immediate openings for the following positions in their Atlanta Data Center:

PROGRAMMER ANALYST

2-5 years experience, COBOL, CICS preferred.

ENGINEERING PROGRAMMER

Position requires 2 to 4 years COBOL and/or FORTRAN experience on IBM 370, 8100, or Honeywell 6000 equipment. Engineering, Computer Science or other scientific-oriented degree is required. Also, a position for an individual with nuclear experience is available.

COMMUNICATIONS ENGINEER/DATA

Individual must have an Engineering or closely related degree with a strong background in telephone/microwave circuit diagnostics and parameters. Familiarity with data communications, line protocols, line monitors, and standard electronic diagnostic test equipment is essential. Duties will include line configurations, installation, and maintenance of on-line remote terminals for one of the Southeast's largest teleprocessing networks.

We offer competitive salary and excellent benefits package. Please forward resume with salary history, in confidence, to:

Personnel Department
SOUTHERN COMPANY SERVICES, INC.
P.O. Box 720071
Atlanta, Georgia 30346
Equal Opportunity Employer M/F

Southern Company Services
the southern electric system

CITIES SERVICE COMPANY

TECHNICAL ANALYSTS

The Natural Resources Department of Cities Service Company has immediate openings for individuals having a minimum of one year experience in FORTRAN, COBOL, or PL/1 for software development in the areas of hydrocarbon production, seismic processing, well data base, well log analysis, mathematical geology, and graphics. Knowledge of structural development methodologies and proven project leadership a plus.

A wide range of company benefits and advancement opportunities are available. Interested applicants should send resume in confidence to:

Manager, Natural Resources Department, File 590
Cities Service Company
Room 205 — 201 P.O. Box 300, Tulsa, OK 74102
an equal opportunity employer M/F

MANAGER

Advanced Business Development

Xerox Electro-Optical Systems, a burgeoning engineering and development segment of the progressive Xerox organization, is searching for a strong and effective communicator to act as Manager of Advanced Business Development for the Imaging Systems Division.

Working closely with the Marketing group, this individual will evaluate customer requirements and perform application studies, as well as prepare proposals and manage early phases of programs. The desired qualifications include a Master's in EE or Computer Science coupled with experience in all facets of digital systems development including mini and microprocessors.

Xerox provides a comprehensive benefits package complete with profit sharing, medical, dental and life insurance, and special recreation and health management programs. For immediate and confidential consideration, we invite you to send resume with salary history to: Professional Employment, Attention: Dept. 20 11 DG, Xerox Corporation, Electro-Optical Systems, 300 N. Halstead St., Pasadena, CA 91107. Xerox is an affirmative action employer (male/female).

XEROX
Electro-Optical Systems

PROGRAMMER/ANALYST

IF YOU'RE MAKING CAREER PLANS, MAKE THEM AT MAURICES . . . .

One of the fastest growing fashion specialty store companies in the U.S., Maurices currently has 270 plus stores throughout a 21 state area and has an immediate opening for a PROGRAMMER/-ANALYST to be responsible for the design and programming of accounting applications.

If you have experience in the following areas you will want to join us in Duluth for this exciting opportunity.

- 3-5 years in systems design and programming of business applications
- IBM 370 (DOS/VS), COBOL, CICS, ETSS

WE OFFER EXCELLENT SALARY AND BENEFITS.

Send your resume in confidence to Sue Lyons, Personnel, Maurices, 105 W. Superior St., Duluth, MN 55802 or call 218/727-8431

Equal Opportunity Employer

DATA PROCESSING OPPORTUNITIES

Allied Data Utility is the Data Processing Center for Allied Stores. If you pursue a career with us, you're choosing good benefits like a four-day work week, in-house video training tapes, generous Jordan Marsh discount, easy access to the MBTA — not to mention professional growth opportunities.

SYSTEMS ANALYST

Applicant should have 3 years of experience as a Programmer Analyst or as a computer systems analyst and the ability to guide, direct and schedule work projects; develop and present recommendations for the improvement or modification of established systems or the design of new systems; develop procedures, coordinate and supervise the preparation of work programs and related work as required.

PROGRAMMER ANALYST/WANG

Working on the latest on-line Wang 2200 VS System, the successful applicant must have a minimum of two years COBOL experience.

PROGRAMMER ANALYST/IBM

Working on IBM equipment, the applicant should have thorough knowledge and 3-5 years' experience in the application and use of data processing equipment, of programming requirements and the ability to gather, assemble and analyze facts and data to arrive at solutions to problems.

The successful applicant will have the responsibility to plan, schedule and supervise the preparation of specialized and standardized computer programs required for large-scale computer processing.

Experience in COBOL is required. Experience with large-scale telecommunications POS systems, CICS command-level language, OS JCL, is a plus.

All positions offer excellent wages and growth potential. To apply, please call Audrey Smith for an appointment at (617) 964-5988, Monday through Friday, or write to her at:

ALLIED DATA UTILITY
275 Grove St., Auburndale, MA 02166
Adjacent to Riverside Station off Rte. 128 in Newton
An Equal Opportunity Employer

SUNBELT OPPORTUNITIES IN ENERGY

Data Processing



Pool Company has over 6,000 employees worldwide and owns and operates more rigs and types of rigs and specialized oilfield equipment than any other contractor in the world. In support of our continued growth we are seeking candidates to fill the following new positions.

PROGRAMMER/ANALYSTS

Successful candidates will have 2 plus years experience with COBOL or PL-1 on large IBM/OS and JCL. Prefer CICS and/or TSO.

PROJECT LEADERS

Should have 3 or more years of above plus supervisory experience.

SYSTEMS DEVELOPMENT MANAGER

Should have 5 or more years development management. This new position will be responsible for more than 25 professionals.

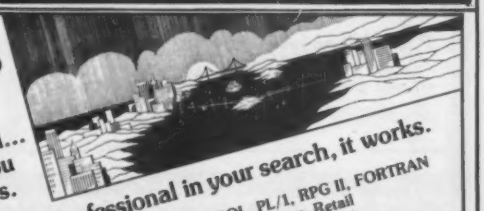
We offer extensive professional and technical education, competitive salaries, a broad range of employee benefits (including tuition reimbursement), paid relocation, and opportunity for professional growth with an energy industry leader. Please send resume along with salary requirements to:

POOL COMPANY
PERSONNEL DEPARTMENT MT
P.O. BOX 4271
HOUSTON, TX. 77210

POOL GERMANY

We are an equal opportunity employer m/f
NO AGENCIES PLEASE

The San Francisco Bay Area



We've got it surrounded... Multiple offices give you Multiple Opportunities.

If you're a professional, use a professional in your search, it works.

- Systems Programmers
- EDP Auditors
- Data Base Administrators
- Systems Analysts
- Programmers—PASCAL, COBOL, PL/1, RPG II, FORTRAN
- Project Leaders—Banking, Manufacturing, Retail
- Marketing Support Programmer/Analysts
- Technical Writers
- Mini's—Programmers, Analysts, User Liaison

Our clients continue to pay interview and relocation expenses for qualified applicants. All fees assumed by clients. Call us collect today and discuss the many opportunities.

ROBERT HALF OF NORTHERN CALIFORNIA, INC.

Jerry Anderson or Bob Couch
111 Pine Street, 15th Floor
San Francisco, Ca. 94111
(415) 434-1900

Jim Dupre
2 Palo Alto Sq., Ste. 212
Palo Alto, Ca. 94304
(415) 493-8700

675 N. 1st St., #600
San Jose, Ca. 95112
(408) 295-9040

SOMETHING GOOD!

***PROFESSIONAL CHALLENGE** with long term career growth opportunities in America's most livable & beautiful area. Small town or cosmopolitan city living in one of the nation's leading data processing metropolitan centers. Mild winters, hunting, fishing and boating. Outstanding compensation plans including excellent bonuses, and **RELOCATION WITH HOME PURCHASE PLANS.**

***SYSTEMS ANALYST:** Two of our blue chip clients are doubling their size. They both are very challenging companies with excellent reputations. You will find an atmosphere that welcomes new ideas and rewards accomplishment. [State of the art hardware and software.]

***PROGRAMMER/ANALYSTS:** IBM, UNIVAC, or DATA GENERAL. Experienced in any of the following: COBOL, BAL, IMS, TSO, CICS, DOS, OS, MVS, FORTRAN, PL/1, DATA BASE, and ON LINE.

***SYSTEMS PROGRAMMERS:** Exceptional opportunity and challenge. MVS, IMS, VM, TCAM, VTAM, DOS, or COMMUNICATIONS . . . Our clients offer any needed training.

***SCIENTIFIC** oil exploration and production, management sciences, mining and graphics.

***INTEGRITY . . .** Our staff of personnel consultants are all experienced data processing professionals — one even has a PhD.

Send resume or phone 918/592-2313

Confidential Search
420 S. Main #708
Tulsa, OK 74103

Exeter Associates

NATIONAL RECRUITING CONSULTANTS

BRUCE A. MONTVILLE
MANAGING PARTNER
(603) 926-6712

DATA PROCESSING MANAGER
NEW INSTALLATION
$30,000-$36,000

If you are ready to take a step up, our client, an exciting energy company, can offer you almost every challenge imaginable.

The Client: 10 years old, $48,000,000 in sales, 900 employees and publicly held.

The Position: Plan, start and head-up new Data Processing Department. A new mini system has been ordered which will service corporate and subsidiary locations. Hire and train staff. Supervise systems and programming group. Report to Corporate Treasurer.

Qualifications: Full degree, ability to work in shirt-sleeve environment, be able to handle applications development, install packaged software and a communications network system. Must be a good communicator and possess executive potential.

For prompt and confidential consideration, forward your resume or call us collect.

(603) 926-6712

P.O. BOX 623, COMPUTER PARK, HAMPTON, N.H. 03842
A COMPONENT OF EXETER INTERNATIONAL, INC.

Sound advice from
Horace Greeley and
National Advanced Systems:

GO WEST

It's still the Land of Opportunity. And that's especially true at National Advanced Systems. We're a young, dynamic computer company, born out of a western tradition emphasizing individual growth and contribution. You can make a difference here.

"Here" is anywhere in the west — from the bright lights of San Francisco to the sunny beaches of San Diego. If you're already here, you know all the other reasons why Horace is so widely quoted.

We're looking for talented systems programmers to develop software and provide technical support to large CPU customers on the West Coast. If you're knowledgeable in the internals of one or more IBM operating systems (MVS, SVS, VS1, VM or DOS/VS), have a background in problem solving with systems control programming and the ability to communicate well, National Advanced Systems has a place for you in the Great West.

Let us tell you more about our western opportunities. (If you're a confirmed Easterner, we have openings on the East Coast, too.) **Call our toll free number (800) 227-1930 (in California call 800-982-5812)** and ask for **Ursula Shepherd.** Or send her your resume: **National Advanced Systems, 3145 Porter Drive, Palo Alto, CA 94304. We are an affirmative action/equal opportunity employer.**

National Advanced Systems

A Subsidiary of National Semiconductor

SENIOR TECHNICAL WRITER

ACI is looking for a professional — a professional who is willing to accept a challenge.

Because of our rapid growth, we are searching for an experienced technical writer to participate in the formation of a new publications group in our product development area. Qualified applicants should possess a strong background in data processing and technical writing. Other desired qualities include experience with software products and mini-computers. Supervisory talent and knowledge of data communications a very strong plus.

ACI is a systems integrator of large data communication and transaction processing networks. Our customer base includes some of the biggest names among financial and industrial firms.

You'll find ACI offers very competitive salaries, an excellent benefit program, and the opportunity to grow with an employee-owned, employee-oriented organization . . . And Omaha offers a relaxed, clean, comfortable lifestyle.

For immediate consideration, submit resume in confidence to:

APPLIED COMMUNICATIONS INC
% T. Barth
208 South 108th Avenue
Omaha, NE 68154

PROFESSIONALISM * RESPONSIBILITY * ADVANCEMENT INCOME * CLIMATE

Whatever your reason for making a career change, now is the time. Your experience as a data processing professional can earn you a position in any number of dynamic, state-of-the-art corporations in the South.

Our economy is expanding so rapidly it out distances the availability of qualified local personnel thus, we must look to the rest of the Nation to fill our needs. SALARIES ARE EXCEPTIONAL AND MAY INCLUDE BONUS. Programmers through Senior Analysts are desperately needed with disciplines in banking, accounting and manufacturing. Virtually, any type of hardware, languages and software is acceptable! All fees, interview expenses and relocation costs are assumed by your new employer.

Choose your reason for a career change and forward your resume for immediate consideration to:

Stanewick, Hart & Associates, Inc.
Suite 325
9400 South Dadeland Blvd.
Miami, Florida 33156
(305) 666-5881

AIRLINE OPPORTUNITIES FOR

SYSTEM PROGRAMMERS PROGRAMMER/ANALYSTS MANAGEMENT

with any of the following experience:

- MVS Internals
- MVS Perf/tuning
- VTAM/NCP
- ACP Internals
- CICS Internals
- CICS
- IMS
- Strong BAL (ALC)
- PL/1 and COBOL
- PARS/ACP
- PARS/ACP
- Financial/Prog.
- Operations

(Salaries $20,000 to $36,000)

Benefits include Free Flights (or very small charge) to U.S. Cities and huge discounts (up to 100%) on Int'l flights. Don't let exciting new projects in state of the art IBM OS environments take off without you.

CALL OR SEND RESUME TO:

International Software Exchange
4520 EAST GRANT ROAD • TUCSON, ARIZONA 85712
TELEPHONE: (602) 881-7010
FREE- EMPLOYER RETAINED

DEPARTMENT HEAD - COMPUTER SCIENCE
East Texas State University

A Doctorate in Computer Science or related area with equivalent computer science background is required. Demonstrated, successful leadership experience is expected in several of the areas of administration, teaching and related program development, and/or research industrial or business experience in the computer-related areas is highly desirable. Previous teaching experience, preferably in Computer Science, is required.

The Department Head coordinates and administers programs in the Department. (The department produces some 95 B.S. and 40 M.S. Degrees per year) Some special responsibilities include active leadership in promoting an effective combination of instruction, research and service; improving, developing and implementing departmental and related interdisciplinary and inter-college programs; establishing industry, government and education at local, state, and national levels.

Rank and salary commensurate with education and experience. Applications must be received by November 1, 1980, with an employment date August 1981, or earlier. Application resume, including transcripts and references, should be sent to: **Dr. John R. Zimmerman, Dean of College of Sciences and Technology, East Texas State University, Commerce, Texas 75428.**

ETSU is an equal opportunity/ affirmative action employer.

N.Y. City
-CONTRACTS, To
$200/DAY
-FULL TIME, To
$35,000

- MINI ASSEMBLER/BASIC
- IBM COBOL, BAL or PL-1
- CICS or IMS or MARK IV
- DATAPOINT

Call or forward resume to:
PARAMOUNT CONSULTANTS
275 Madison Avenue
New York, New York 10016
(212)684-6606

F-O-R-T-U-N-E
OF DENVER INC.
Sr. Software Engineer

Client company seeking individual to be responsible for design and implementation of real time systems and concepts. Background in multi-tasking, interpretion, concurrent processes and data structure. Familiar with Z-80 or Intel 8085, coupled with Pascal or Assembly language.

Should have 5+ years practical experience. B.S.E.E. or B.S.C.S. required. Low 30's.

Call collect or send resume to: F-O-R-T-U-N-E of Denver, E.D.P. Division, 380 S. Monroe St., Suite 330, Denver, CO 80209. (303) 393-0244.

Computer Science Faculty

A small southeastern Pennsylvania liberal arts college seeks a person with background in data management, information systems, or software engineering beginning Feb. 1981 to teach undergraduate courses in a recently instituted and currently expanding computer science curriculum. CDP or industrial experience with supportive academic credentials. Resources include several mini-computers and a DEC 11/70. Ten month contract with summer teaching available. Rank and salary open. Application deadline Nov. 1. Apply to **Dr. Arthur Hill, Dept. of Mathematics and Computer Science, Albright College, Reading, PA 19603.**

PROGRAMMER/ANALYST Duties: Design, analysis, and programming of management information systems using various teleprocessing and data base facilities such as IMS, TOTAL, DATACOM, etc. The specific assignment requires knowledge of DATACOM DB/DC, PRIDE and PRIDE/LOGIK, Datapoint minicomputers, Warnier-Orr diagrams, COBOL, and a familiarity with the creation and implementation of supply and inventory systems. Equipment Operated: Datapoint minicomputers, 3270-type terminals. WC: Due to the nature of our business, applicants must be willing to travel and relocate as necessary. Hours - 40/week. Minimum Requirements: High school graduate and two years experience in duties as specified above. College education is desirable. Salary: $1600/Month. This specific assignment is located in Boise, Idaho. However, we do have other assignments available nationwide. R.J. Hansen Associates, Inc. 555 Capitol Mall, Sacramento, CA 95814 (916) 441-7232.

Programmer Analysts

Our expanding data processing department offers opportunities for career oriented data processing professionals to play key roles in meeting future objectives. Responsibilities include extensive contact with user departments for systems support, analysis, design and programming.

Applicants should have at least three years' or more COBOL experience in commercial applications. Experience with Burroughs medium systems in an on-line data base environment is preferable.

We are the 500-member staff serving 150,000 members. We offer a professional environment, many paid benefits, good working conditions and an excellent career potential.

Salary up to $26,000
Send resume to: Ms. Silvia Mihelic

American Institute of Certified Public Accountants

1211 Avenue of the Americas
New York, New York 10036
An Equal Opportunity Employer

SYSTEMS DEVELOPMENT

We are a well established systems development organization located in Center City Philadelphia with openings for:

DESIGNERS
PROJECT MANAGERS
ANALYSTS
PROGRAMMERS

Individuals will work on an integrated all-line insurance system for distributed database/-processing environments. This project will also include the integration of word and data processing.

Our goal is to become independent from any outside source of software.

We will also be developing a complete set of procedure manuals for both current and newly established insurance processing job descriptions.

Our company has set no limitations on salary or benefits for high-quality professionals who can operate in a challenging development environment.

Responsible positions and rapid advancement are based on native ability and professional attitude, not necessarily length or depth of experience.

Please reply in confidence to:

CW Box 2408
375 Cochituate Rd., Rte. 30
Framingham, MA 01701

Include your resume, a statement concerning your career goals, and your salary requirements.

Employment agency resumes will not be considered.

GENERAL DATA SYSTEMS, LTD.
No Phone Calls Please

At **APPLEONE Employment Service,** a full service agency, we take pride in our ability to match the individual's skills with our client companies' needs. Our data processing staff devotes 100% of their time to the DP industry. All agency fees are paid by the employer. Some of our exciting career opportunitites in Sunny California include:

Sr. Systems Programmer	$36K
Marketing Support Engineer 4 yrs. data communication exp.	$35K
Field Technical Support	to $35K
Programmer Analyst/OS/MVS	$30K
Sr. Programmer Analyst	$27.5K
MVS Systems Programmer	$36K
Customer Service Engineer/ PDP 10 or 11 experience	to $25K

If you possess the above skills or if you are a company seeking these skills please contact Darlene Missildine, **714/957-6026** or **213/937-9632**

APPLEONE Employment Service, Inc.
3805 So. Bristol, #F
Santa Ana, CA 92704

position announcements | position announcements | position announcements | position announcements | position announcements

SOFTWARE ENGINEER
Honeywell GCOS

Hoffmann-LaRoche, one of the world's leaders in the pharmaceutical and health care industry is located in a suburban area 12 miles west of New York City.

We seek an individual who will provide system software expertise and support. Responsibilities will include participation in projects involving the implementation and promotion of computer technologies. The Corporate Computer Center has multiple large-scale Honeywell systems, supporting over 800 business and scientific users.

Qualifications: BS in Computer Science or related discipline. Five years experience in maintenance and enhancement of Honeywell GCOS utility Software, proficiency in GMAP, B, and Fortran languages, data management, service and utility routines, time sharing, and transaction processing.

Please send resume and PRESENT SALARY to: Mrs. Eleanor M. Malone Professional Placement Specialist, Hoffmann-LaRoche, Inc., Nutley, New Jersey 07110.

An equal opportunity employer m/f

ROCHE HOFFMANN-LA ROCHE Inc.

SAUDI ARABIA
Data Processing Professional

SYSOREX INTERNATIONAL, INC., a rapidly growing Systems Management Company, now developing innovative multi-technology systems in Saudi Arabia, seeks an experienced Data Processing Professional for the following position:

SR. SYSTEMS ANALYST

Opportunity for an experienced Analyst (min. 6 yrs.) to be involved in analysis and design of commercial TP applications. You must be knowledgeable in COBOL and IBM systems using CICS and 3270 terminals. Your experience must include project management, user interface and data gathering techniques. Emphasis on excellent written and oral communications. Degree required, preferably in Computer Science.

SYSOREX offers excellent salaries commensurate with experience, regular merit increases, bonus eligibility and a comprehensive benefits program which includes 30 days annual vacation with paid round trip transportation for employee and family to place of residence, 15 paid holidays, free furnished family housing and free education for children.

Please send resume, including salary history, to **Harry T. Delk, Director of Personnel and Administration, SYSOREX INTERNATIONAL, INC., 10590 N. Tantau Ave., Cupertino, CA 95014.**

SYSOREX
Sysorex International Inc.



TECHNICAL WRITER

Excellent opportunity for an individual with a minimum of 2 years technical writing experience to join a growth oriented Data Processing company located in Dayton, Ohio. Position will report directly to the Supervisor of Technical Publications. Must be able to write user-oriented documentation for software systems in clear and concise language. Must have IBM mainframe experience.

If you feel you might be qualified for this opportunity, please submit a resume or descriptive letter in confidence to:

Mead Data Central
P.O. Box 933
Dayton, OH 45401

We Are An Equal Opportunity Employer M/F

SR. SYSTEMS PROGRAMMERS

Utah State Information Systems Center
Salt Lake City, Utah

System Hardware: Amdahl 470/V6, ITEL AS/5, IBM 4331, 3330 and 3350 Shared DASD, COMTEN Communications Controller, BSC State-wide Communications Network.

System Software: MVS 3.8A, VS1, JES2, TSO, CICS/VS, IMS/DL1, TCAM, BTAM, Complete, ADABAS, COMTEN NCP, RESOLVE, CMF/RT.

Successful applicants will be responsible for the installation, maintenance and integrity of the system software.

Minimum requirements are a Bachelor's degree in Computer Science plus a minimum of 4 years experience in programming with at least 3 years in systems programming. An equivalent combination of education and/or employment may be substituted. Starting salary is negotiable depending on education and experience. Please send resume by October 29, 1980 to: **Office of Personnel Management, Attn. Cathryn Collis, 130 State Capitol, Salt Lake City, Utah 84114. Phone 801/533-5427.**

FLORIDA PROGRAMMER ANALYST

International Corp. based in S. Fla. offering outstanding opportunity. Position requires 370/OS, COBOL background with strong financial business design experience. You will interface at various dept. levels within the Corp., participate as a Sr. Analyst on financial projects. Full relocation package to out-of-town applicants, excellent benefit program. This Corp. has emerged as one of S. Florida's finest D.P. centers. Experience in manufacturing is a plus! Salary to $25,500

Relocation and Fees Paid by the Companies Many Unlisted Openings

Please call or rush resume and salary history in confidence to: Chuck Neil

ROBERT HALF
OF MIAMI, INC.
1395 NW 167 Street – Suite 100
Miami, FL 33169
Dade (305) 625-5433
Broward (305) 764-1550

SYST. PROG. OPER. MGR.
Must Be Trained & Experienced In
NCR
V8400-V8500 systems.
and Preferably with Exposure to 721 Communications Processor.
Exceptional Opportunity for SOFTWARE SYSTEMS/ OPER. MGR.
With One of World's Leading Earth Moving & Heavy Equipment Distributors.
Salary $2000-2700 Per Mo. PLUS
Excellent Benefits Program Including: Single or Family Status, Attractive Company Provided Housing, Automobile, Full Medical Services, 75% Tuition Assistance for Children, Liberal Holiday-Home Leave-Airticket Policy Provides Opportunity for Exotic Travel & Vacations. Location Jeddah, Saudi Arabia, Dynamic Cosmopolitan Red Sea City.
LISA Interviews During October
Write:
CW Box 2429
375 Cochituate Rd., Rte. 30
Framingham, MA 01701

DATA PROCESSING MANAGER

Teaching hospital in Kansas City Missouri is seeking an experienced individual to head up a data processing department of 20 employees. Position reports directly to associate executive director. Systems include IBM 4341 and many on-line programs. Hospital management experience and college degree preferred. Hospital committed to full implementation of HIS. Submit resume and salary requirements to:

Laurie Seaman
TRUMAN MEDICAL CENTER
2301 Holmes
Kansas City, MO 64108
Equal Opportunity Employer

CUSTOMER ENGINEERING

SALES REPRESENTATIVE

Immediate openings in Houston, Dallas and San Francisco Bay Area, to sell computer maintenance services and computer equipment. Experience should include sales or service of DEC or Xerox computer systems. You will have your own territory, and a substantial base salary, plus commissions. Travel required.

SERVICE ENGINEERS

You belong in our Technical Support Division if you are experienced in any of the following areas:

—DEC PDP-10 or PDP-11 System Maintenance
—IBM or PCM Disc, Tape or System Maintenance
—XDS, Sigma or 900 Series System Maintenance
—Related experience on Systems or Peripherals

INSTRUCTORS

Use your technical knowledge and expertise to train our PDP-10 and PDP-11 Hardware Maintenance Personnel.

SOFTWARE/DIAGNOSTICS

You will apply your PDP-10/11 Software experience to integrate existing Diagnostics into Exerciser, then code and create a Diagnostic Operating System.

For more information call Pat or Diana at 408/446-7611, or send your resume in confidence to:

TYMSHARE
Tymshare, Inc.
10231 Bubb Road
Cupertino, CA 95014
Attn: Pat/Diana

An Equal Opportunity Employer M/F/H

Test Equipment Design Engineer

We currently have an opening in our Test Equipment Design group for an individual with three years' experience in computer test equipment design. The qualified candidate will be responsible for the design and/or updating of ringout and power supply testers, auto burn-in racks, and other analog/digital devices, as well as provide work direction to 2-4 technicians. A BSEE or equivalent experience plus the ability to work with minimal supervision are required. Salary will be $20,000 per annum.

Interested candidates should forward their resume, with salary history, in confidence to L. J. Doherty, HONEYWELL SSTD, 300 Concord Road, Billerica, MA 01821.

An Equal Opportunity Employer M/F

Honeywell

People, Our Competitive Edge

position announcements | position announcements

YOURDON inc.

SYSTEM SPECIALISTS DATABASE DESIGNERS

YOURDON specialists train EDP professionals in structured techniques of analysis, design, programming and database design.

We've developed what we think is the first pragmatic technology for the analysis and design of EDP systems. In the past 5 years, we've trained over 75,000 professionals and our growth continues to accelerate. We're the best in our field and we want you to join us.

As a YOURDON staff consultant you will:
□ conduct seminars in your area of expertise □ consult with our clients on projects that use our techniques □ develop training courses, write articles, and participate in conferences.

To qualify you must have:
□ at least 3 years of professional experience as a systems analyst, designer, or programmer, or a minimum of 3 years professional experience within a database group □ practical experience in some of the structured techniques □ excellent speaking and writing skills □ availability to travel 2 weeks per month

This is a perfect time to begin building a career as a YOURDON staff consultant; our future is bright.

For immediate consideration, or to receive our Career Opportunities booklet, forward a resume in strict confidence to: Ms. Toni Yourdon, YOURDON inc., 1133 Avenue of the Americas, New York, NY 10036

YOURDON inc.
An EEO/Affirmative Action Employer

HOUSTON
EDP PROFESSIONALS

SYSTEM ANALYST — $25-30,000

PROGRAMMER-PROGRAMMER/ANALYST $16-23,000

SYSTEMS PROGRAMMERS $30-33,000

Experience — Insurance
Benefits — Dental, parking, profit sharing, plus others.
Hardware — IBM 370/MVS/COBOL

PROGRAMMERS — $16-20,000
PROGRAMMER/ANALYSTS — $18-24,000
ANALYST — $20-26,000

Experience — Banking Systems
Applications — DDA, Savings, Trust, MSA, G/L, Payroll, I/L, C/L, Credit Cards
Hardware — IBM 370/MVS/COBOL

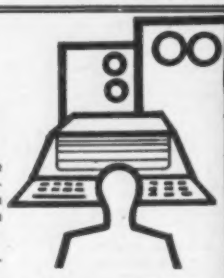
ANALYSTS/PROGRAMMERS $20-27,500

Experience — Manufacturing
Applications — Inventory Control, Order Entry, MRP, Billing, etc.
Benefits — Dental, company-paid life/-health, profit sharing, savings plan, etc.
Hardware — IBM 370/MVS/IMS/COBOL

Call JIM FLEMING collect at 713/688-1800 for further information or send a copy of your current resume to:

ROBERT HALF OF HOUSTON, INC.
720 N. Post Oak Rd. — Suite 228
Houston, TX 77024

EDP AUDITOR



Warner Bros. Inc., offers a professional career opportunity with increased responsibility in EDP Systems.

Requires familiarity with systems, large IBM main frame, TSO on-line systems, data base and audit Software. 3 years Data Processing experience with at least 1 year Internal EDP Auditing. BS and/or MS in Computer Science or Information Systems preferable. Consideration given for CDP, CCP, CIA credentials.

We offer a salary of $26 to $30K with a review in February and an excellent benefits package.

Please send resume to the attention of the Personnel Manager:

WARNER BROS. INC.
4000 Warner Blvd.
Burbank, Ca. 91522 Equal Opportunity Employer M/F/H

SENIOR SYSTEMS ANALYST
Salary up to $40,000

CACI, a rapidly growing, $35 million research firm at the forefront of management, computer, and analytical applications, seeks highly motivated senior systems analyst to build staff and expand business in White Plains, New York office.

The position involves extensive interaction with decision-makers of a large manufacturer and design and implementation of user-friendly marketing information systems.

Candidates must have at least two years business experience developing computer-based systems in corporate environment, and proficiency in programming, interactive and graphics packages, and statistical methods. Marketing or operations research applications desirable. Track record in marketing computer applications projects a definite plus.

Advancement to management based on technical and entrepreneurial performance. Excellent benefits and bonuses. Send resume, references, and salary history to:

C.A.C.I.

Dr. Bertram I. Spector
Vice President
CACI, Inc.- Federal
1815 North Fort Myer Drive
Arlington, Virginia 22209

An Equal Opportunity Employer M/F/H/V

Dallas
System Software Personnel

Billion dollar electric utility company with centralized data center has immediate need for persons within the rapidly expanding corporate Information Services Department to test and install new or modified systems software.

Positions at multiple levels offer growth potential for professionals demanding challenge and opportunity. Present staff expanding to support installation of second 3033 with **MVS/SPI and 2** as well as 4300 distributive process network.

Present state-of-the-art IBM 3032 environment is **MVS/SE2, ACF/VTAM** with 600 CICS, ROSCOE, and TSO terminals.

Mail resume and salary history to Employee Relations Division, Management Recruiting Department.

Central and South West Corporation
2700 One Main Place • Dallas, Texas 75250

Equal Opportunity Employer

COORDINATOR OF DATA PROCESSING CAPE COD, MA

EDUCATION: (1) Bachelor's degree in business administration or accounting, education, mathematics or computer sciences, or (2) Graduation from an accredited educational institution with intensive course work in computer programming.

EXPERIENCE: (1) At least five (5) year's supervisory experience in either business or educational computer operation and programming (2) Program and systems analysis experience (3) Classroom experience desirable (4) Demonstrated ability in RPG, BASIC AND COBOL computer languages (5) A variety of experience in the operation of computer equipment including Data General. **Salary: $35,000.**

Forward resume to: **DENNIS-YARMOUTH REGIONAL SCHOOL DISTRICT, Donald D. Johnson, Director of Fiscal Affairs, 296 Station Avenue, South Yarmouth, MA 02664.**

"An Equal Opportunity Employer"

ADVANCEMENT OPPORTUNITIES
(NATIONWIDE — CONFIDENTIAL — FEE PAID)

Hundreds of listings — **ALL LEVELS** — top companies — **ALL INDUSTRIES.** Companies pay all fees and expenses — Starting salaries $20,000 to $45,000.

Senior System Analysts
Programmer/Analysts
Application Programmers
System Programmers
EDP Auditors
Hardware/Software Analysts
Mini/Micro Specialists
Project Mgrs./Leaders
Data Base Administrators
Mgrs. Systems/Programming
Mgrs. EDP Auditing
Mgrs. Technical Support
Mgrs. Data Processing/MIS
Mgrs. IBM System 3/34/38

For more details, send your resume, or call:
Mark Fuller
CADILLAC ASSOCIATES, INC.
32 W. Randolph St., Chicago, IL 60601
(312) 346-9400

DURING THE MONTH OF SEPTEMBER

COMPUTERWORLD

Published more classified ads and more classified lineage than all the other computer publications combined!

Put Computerworld Classified to Work For You!

Call -TODAY- at 617/879-0700

SYSTEMS PROGRAMMERS NORTH CAROLINA

Enjoy challenging work in "state of the Art" installation and your leisure time with a lifestyle that blends with the climate. Our client, Fortune 500 firm establishing a new facility in Research Triangle Park seeking qualified IBM software support persons (3) with minimum one year in OS/MVS; JES II internals. Highly visible advancement opportunity. **Send Resume in confidence to Louis Leimone, CPC., c/o 3101 Guess Rd., Suite C, Durham, NC 27705.**

IMMEDIATE NEEDS
VIP PERSONNEL

position announcements | position announcements | position announcements | position announcements | position announcements

The Future is NOW at DCC.
The Future is NOW at DCC.

BIAS DIVISION
Our Broadcast Division is the industry leader in DP automation for TV and Radio stations worldwide. We are heavily involved in the design, coding and implementation of the State of the Art Software for data base management for on-line processing on a minicomputer linked to a packet switching network, electronic mail system, etc.

Openings exist for:

LEAD MINI SOFTWARE ANALYST—experience should include at least 5 years minicomputer software background (Data General experience a definite plus) and at least 1-2 years at the supervisory level.

SENIOR MINI SOFTWARE ANALYST—experience should include at least 3 years minicomputer software background with potential for growth to the lead level.

MINICOMPUTER DIVISION
The Minicomputer Division is involved in the design, coding and implementation of State of the Art Software products for communications, data management, distributive processing and word processing in a minicomputer environment.

Openings exist for:

PROGRAMMER/ANALYSTS—assist in the design and implementation of systems level software on Data General minicomputers and microcomputers. Desirable backgrounds include operating systems development, communications subsystems, word processing, data capture and data base management applications. 2-3 years system level experience on Data General equipment and/or 2-3 years word processing experience on any mini or micro computer system is a definite plus.

We offer excellent working conditions, employee benefits program, and attractive salary based on qualifications. Relocation assistance is provided. Interested professionals are requested to send resume to our Memphis headquarters or call:

HOLLY JENKINS (901)346-3544

dcc
DATA COMMUNICATIONS CORPORATION
3000 Directors Row/Memphis, TN 38131
Equal Opportunity Employer M/F

The Future is NOW at DCC.
The Future is NOW at DCC.

PACIFIC N.W. CALIFORNIA

Business Analyst
A large northwest company is seeking a key individual with consulting expertise and knowledge of operation improvement methods/data processing. Will be involved in profit planning and management reporting on a Divisional Level. Experience should include BUDGET AND PLANNING, CONTRACT AND LEASE NEGOTIATIONS. MBA a plus. To $37K

Technical Openings

IBM 303X/4341	
Mark IV Specialist	to $38K
Software Spec. IMS/ADABAS	to $33K
Systems Internals MVS	to $32K
Systems Prog. MCP/VTAM	to $28K
Sr. Tech Support DOS/CICS	to $32K
Sr. Systems Spec. VM/CMS	to $30K
Database Analyst IMS/DL-1	to $27K
OVERSEAS MVS/JES3	$Open
OVERSEAS IMS DB/DC	$Open
Capacity Planning	to $32K
Performance Analyst	to $30K
Communications Specialists Install hw, sw, minis	to $28K
Software Prog. IMS/VSAM/TP	to $28K
Hardware/Software Eval.	to $33K
Tech Consult. for Applications New positions	to $36K
Honeywell 6000	
Systms Analyst GCOS	to $30K
Sys. Spec. TDS/FORSIGHT	to $32K
Technical User Interface	to $30K
Database Admin DMIV/IDS II	to $28K
Recovery Analyst	to $28K
Hewlett-Packard 3000	
Specialists Image/Query	to $28K

Many technical opportunities available throughout the West and Overseas. For details call COLLECT or send resume.

Al Friedman
Jim Klassen Judy Haydrick
(206) 455-8300
Foote-Waldron
210-156 Avenue NE Bellevue, WA 98004

SALES PROFESSIONALS

The Decade of the 80's will bring new horizons in Computer Technology!

We are looking for seasoned Sales and Management Personnel in the San Francisco, Los Angeles, Dallas, and Chicago areas to market our advanced systems concept in distributed data processing to the scientific/engineering community.

Send resume to: **Apollo Computer, Inc.**
5 Executive Park Drive
North Billerica, MA 01862
Attn: Gerald Stanley
V.P. Marketing

apollo computer
An equal opportunity employer

SALES AND LEASING DATA TERMINAL PRODUCTS

Immediate openings Dallas/Ft. Worth, Chicago for results-oriented sales persons to take over and expand existing customer base. Should have successful CRT/PRINTER sales experience plus desire to move into branch management. Base salary, expense allowance & "no ceiling" commission plan. Full company paid life, health, dental and retirement benefit plan.

For interview, call
TOLL FREE 800/323-2135
in Illinois 312/693-6539

FLORIDA POSITIONS PROGRAMMERS TO MANAGERS

$24,000 to $39,000 to start

Due to rapid growth and the influx of many major corporations to the Florida market, the opportunities for Data Processing professionals in all applications fields have never been better. We at Alan-Mitchel Associates, Inc. have over 1200 current up to date openings plus many other positions coming open in the very near future, with companies that offer job stability, advancement, excellent benefits, and full relocations. We are in a position to market your specific skills in manufacturing, retail, banking, financial, or general business environment from micros to mainframes. Since we deal solely with Data Processing professionals, you can be assured that we will find you the position that will fit your qualifications and meet your personal and professional goals. All service charges and interview expenses are paid by our client companies leaving no financial obligation on your part. If you have been contemplating a move to sunny Florida or are now actively seeking a position in this area, contact the recognized professionals in this market by calling collect or sending your resume to Paul Clark. Bilingual a plus! IMS a plus!

ALAN-MITCHEL ASSOCIATES, INC.
1620 South Federal Hwy., Suite 901
Pompano Beach, FL 33062
(305) 785-6290
(8:30 am - 8:00 pm M-T & 8:30 am - 5:00 pm F)
Service charge assumed by client companies

Data Processing Assistant Manager

An expanding social service agency in Brooklyn is seeking a qualified individual for a challenging and rewarding career opportunity.

Responsibilities include developing systems from the feasibility stage through implementation and documentation, liaison with users, technical systems maintenance and shift supervision.

A knowledge of COBOL is essential; 3-5 years experience in systems and programming is also required. Experience on interactive systems is desirable but not essential.

Excellent fringe benefits include health and major medical, dental and life insurance, one month vacation and 13 paid holidays. Salary to $20K. Please send resume and salary history to: **Catholic Charities, Diocese of Brooklyn, 191 Joralemon St., Brooklyn, N.Y. 11201. Attn: Alan McLean.**
Equal Opportunity Employer

NEW OS/MVS INSTALATION

We are converting our DOS/VSE shop to OS/MVS using twin IBM 4341 processors and an IBM 3705 under ACF/VTAM. Give yourself the opportunity of working in this exciting environment. To meet our objectives by mid 1981, we have immediate openings for:

SYSTEM PROGRAMMERS

DOS/VSE or OS/MVS system programming experience required. Our systems include: DOS/VSE, OS/MVS, CICS/VS, IDMS, VTAM and more.

ANALYST PROGRAMMERS

Cobol environment with state-of-the-art technology, data base, and teleprocessing systems. IBM and commercial systems experience desirable. Minimum requirements: BS/BA degree or equivalent work experience. Individuals must have knowledge of Cobol. Experience with OS/MVS, IDMS, and/or CICS helpful.

Submit resume and **salary requirements in strict confidence to:**

Employment Supervisor
PUBLIC SERVICE COMPANY OF N.H.
P.O. Box 330
Manchester, N.H. 03105

PSNH PUBLIC SERVICE Company of New Hampshire
An Equal Opportunity Employer M/F

COMPUTER CENTER MANAGER

This is a new position, available November 17, which provides the opportunity to manage the computer operation of a small college. Responsibilities include the coordination of data entry, training of personnel, development of end-user manuals, collection of data, and supervision of student employees.

Requirements: Bachelors degree and experience or an equivalent combination of education and experience; computer training, a working knowledge of BASIC, and experience in systems design and modification.

Starting salary: $17,000
Deadline for applications: October 24, 1980
Apply: Personnel Office
La Roche College
9000 Babcock Blvd.
Pittsburgh, PA 15237
An Equal Opportunity/ Affirmative Action Employer

DATA PROCESSING INSTRUCTOR

Teach Data Processing classes in A.A.S. degree program in 2 year community college program using an IBM 370 DOS/VS computer system. Bachelor's Degree and post secondary teaching experience required. Preference given to masters degree, CDP and experience in business. **Closing date Oct. 31, 1980. Send letter of application and resume to Personnel Dept., Prairie State College, 202 So. Halsted, Chicago Heights, Ill. 60430.**
Affirmative Action/ Equal Opportunity Employer

Tomorrow-minded
UNIVAC APPLICATION ANALYSTS



Martin Marietta Aerospace, NASA's Contractor on the Space Shuttle External Tank, has immediate openings for Univac Application Analysts.

Position requires designing and programming a variety of engineering and specific programs utilizing ANS/COBOL for application on Univac 11XX equipment.

Qualified individuals should possess a BS in Mathematics, Computer Science, or related discipline, and have a minimum of 3 years scientific and/or business programming utilizing data base methodology.

We offer competitive starting salaries and fully paid company benefits. These opportunities exist at the Michoud Assembly Facility located in Suburban East New Orleans. Qualified candidates interested in learning more about these opportunities at Martin Marietta...the tomorrow-minded aerospace people, should forward resumes including salary history to: Ms. Dottie McCann, Martin Marietta Aerospace, P.O. Box 29304, New Orleans, Louisiana 70189. We are an equal opportunity employer, m/f/h.

MARTIN MARIETTA

SENIOR SYSTEMS PROGRAMMER
POSITION AVAILABLE FOR IBM 4331
RESPONSIBILITIES

- The installation of operating systems and component software
- Software changes
- Evaluation and correction of software and hardware problems
- Provide technical assistance to operations and programming staff
- Document and record all systems software and hardware changes
- Develop in-house routines as required
- Assist in data base preparation
- Plan, develop, and install communication network in related software
- Optimize software performance

QUALIFICATIONS

- Graduate education desirable
- Five to eight years in data processing with at least five years in systems programming
- COBOL, CICS, FORTRAN, DL 1, Assembler
- Strong intra-personnel skills

Starting Salary - $22,740 to $26,640

Send resume to: Personnel Dept.
City of Shreveport
P.O. Box 31109
Shreveport, Louisiana 71130
The Sportsman's Paradise
AN EQUAL OPPORTUNITY EMPLOYER M/F

A NATIONWIDE CAREER SERVICE FOR COMPUTER PROFESSIONALS

Programmer analysts, project leaders, systems programmers, IBM, Honeywell and minis.
Salaries to $30,000

No fees or contracts. Our client companies pay all expenses. Career consultation prior to any action. Over 1000 EDP positions represented through our network of 30 local offices.

Send your current resume (or an old one with pencil update) together with salary history and geographic preference in complete confidence to our suburban Philadelphia headquarters . . . or phone:



Systems Personnel, Inc.
Suite C-200, 207 Fox Lane
Wallingford, PA 19086
215-565-2920

Systems Personnel Inc.
MEMBER OF NATIONAL COMPUTER ASSOCIATES

SENIOR APPLICATIONS & SYSTEMS PROFESSIONALS

Products that Perform are Related to successful Careers Consider . . .

UCC-I (TMS) — ICP's $10 Million Club
UCC-2 (DUO) — ICP's $20 Million Club
UCC-FCS (Gen. Ledger) — ICP's $20 Million Club
Plus Many More!

Put your career with a company that understands Performance!

The Software Division of University Computing Company is seeking a few **good** experienced data processors in Dallas, Texas.

The Commercial Applications group has openings for:

SR. PROGRAMMER/ANALYSTS with 3 plus years of extensive COBOL programming on IBM 370 OS systems. In depth knowledge of financial systems, especially General Ledger and Accounts payable. Positions involve heavy user interface, support, training and implementation. Packaged software installation experience desired. Moderate travel.

The Operating Systems Software group has openings for:

SYSTEMS PROGRAMMER and/or APPLICATION PROGRAMMERS with 3 plus years of extensive ALC with OS internals exposure and OS MACROS. A DOS background is desired. Primary duties involve user interface and support including user seminars, designing, developing and testing product enhancements. Some new development opportunities for OS systems products. Particular emphasis on Tape Management Systems, Production control Systems, DOS to OS conversions and Automated Recovery Systems.

The Financial Industry Application group has opening for:

SENIOR PROGRAMMER/ANALYST with 3 plus years ALC and/or COBOL experience. Background should include IBM OS, DOS, CICS, or DCS, DBS or VSAM, DL1. Primary emphasis on banking industry to include EFT, MICR, Commercial Loans, Installment loans, Customer Information files. Will assist user education, training and installation of program products. User seminars and project coordinating skill. Limited travel.

If you are good enough to be an expert, UCC wants to talk to you. Remember, at UCC, our only business is data processing. We offer a unique opportunity to apply your talents along with comprehensive benefits package including competitive salaries, advancement and incentive programs.

For additional information regarding employment with this innovative leader in the field of computer software, please call or write:

Bill Tabor

UCC
UNIVERSITY COMPUTING COMPANY

UCC Tower, Exchange Park
Dallas, TX 75235
(214) 353-7181

We Are An Equal Opportunity Employer M/F

Pacific Northwest

Programmers-Analysts

Washington Public Power Supply System is a young, growing major Pacific Northwest Company engaged in the energy business. Immediate openings exist for Programmer/Analysts and Systems Analysts to support development of interactive, state-of-the-art information systems. To qualify for one of these career building opportunities, candidates should possess a minimum of three years' experience.

We are located in Richland, Washington, on the banks of the Columbia, Yakima, and Snake Rivers. This area is one of the nation's fastest growing, with good weather, clean air, and convenient outdoor recreation including boating and sailing. Nearby mountains and national parks provide varied recreational activities such as skiing, camping, hiking, hunting and fishing.

If this exciting personal opportunity appeals to you, send your resume and salary history in confidence to: **P.J. Jongeward, Dept. PJ/11-01, Washington Public Power Supply System, P.O. Box 968, Richland, WA 99352.**

For a rapid review of your credentials, call collect to our **Data Processing Manager at (509) 372-5483.** An Affirmative Action Employer.

Washington Public Power Supply System
Building Energy Resources for the Future

WPPSS

COMPUTERWORLD CLASSIFIEDS WORK!

- POSITION ANNOUNCEMENTS
- BUY SELL SWAP
- SOFTWARE
- TIME & SERVICES
- SOFTWARE FOR SALE
- REAL ESTATE
- BUSINESS OPPORTUNITIES

It's easy to advertise in COMPUTERWORLD. If you don't have an advertising agency to supply us with copy, layout and order, or a camera ready mechanical, stat or film negative of your ad, just call Sue Stevens at 1-800-343-6474. She will be glad to take your ad and typeset it in available fonts at no extra charge. If you have lengthy ads that require logos and artwork, just send a clean typewritten copy of your ad to the classified advertising department at COMPUTERWORLD (telecopier service is available): note the ad size you want; and, if you want your company logo to appear in your ad, please be sure to include a camera-ready copy with your insertion order. You should also supply any special borders, headlines and artwork that you want in your ad. Our Art Department will follow your suggested layout as closely as possible if you wish to send one.

Ad closing is every Friday, 10 days prior to issue date.

Rates: Open rate is $73.50 per column inch. Columns are 2" wide. Minimum ad size is 2 column inches (1 column wide by 2 inches deep), and costs $147 per insertion. Additional space is available in half-inch increments. Some sample sizes and costs are shown.

1 col x 4" - $294
2 cols x 4" - 588
2 cols x 5" - 735
2 cols x 8" - 1,176

Discounts are available when you run more than 35 column inches of advertising in a year anywhere in Computerworld.
Box Numbers are available. $10 per insertion.
Ad Closing is every Friday, 6 working days prior to issue date (issues are dated Monday)

To reserve space for your ad, or if you'd like more information on Classified advertising in COMPUTERWORLD, call our office nearest you.

Boston - (617) 879-0700
New York - (201) 967-1350
Chicago - (312) 827-4433
San Francisco - (415) 421-7330
Los Angeles - (213) 450-7181
TELECOPIER SERVICE - (617) 879-0700

William J. Mills, Manager Classified Advertising

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 709 FRAMINGHAM, MA 01701

postage will be paid by

CIRCULATION DEPARTMENT

COMPUTERWORLD

375 Cochituate Road, Rte. 30
Framingham, MA 01701

Detach here, moisten and seal envelope securely before mailing.

Fold and insert order form (attached through binding) and remittance here.

buy sell swap | buy sell swap | buy sell swap | buy sell swap | buy sell swap

BUY SELL SWAP

BUY SELL TRADE LEASE

DEC
AVAILABLE TO SHIP NOW

SYSTEMS
D325 D336 D358 D576

CPU'S
11/03 11/23 11/34 11/60 11/70

DISKS
RL01 RL02 RK06 RK07 RP04 RP05
RP06 RM03 RX211 RX11

TAPE DRIVES
TU10 TE10 TU16 TE16 TU45 TU77

MEMORY
MS11JP MS11KE MK11BE
MJ11BE MS780 MS11LD

CALL FOR QUOTE
HUNDREDS OF OPTIONS AVAILABLE
DZ's, DH's, DL's, DU's, DR's, FP's

NATIONAL COMPUTER EXCHANGE

6980 ARAGON CIR., #5 / BUENA PARK, CA 90620
(800) 854-7224 — (714) 522-1870

DEC SPECIALISTS

Buy & Sell	New & Used	Immediate Delivery	
DH11AD,AE	RK07	FP11A,C	MK11BE
DZ11A,B,E	RL02	LA180	MS11LB
DD11CK,DK	RL01	LA120	MJ11BE
RM02,RM03	TE16	VT100	MS780

Leasing Available
Complete Systems - Available Now
VAX 11/70 11/44 11/34 11/23 11/03

NATIONAL DATA SYSTEMS, INC.
Equipment Sales Div.
299 Market Street
Saddle Brook NJ 07662
201-843-5300

BUY•SELL•LEASE

3741 3742
029 I.B.M. 129

WILLIAM MARION COMPANY, INC.
P.O. BOX 309, HACKENSACK, N.J. 07602
CALL (201) 343-4554

For Sale or Lease
3830-2
2150, 2151, 6111, 8170
Available Immediately
Month to Month or Long Term

Short Term
Operating Leases
4331, 4341
4300
Peripherals

BARRETT
(914) 682-1960

DEC NOW

Vax Systems	CALL
11/23AA or Datasystems	NOW
11/04, RL01 System	$19,000
11/34A systems	NOW
11/70 W/RP06's or RM03's New and Used	NOW
Peripherals, disc tape, and boards	
VT100	$1700.00
RL02's	STOCK

WANTED FOR CASH
any and all DEC systems and peripherals
All inquiries immediately answered

DATAWARE
SYSTEMS LEASE, INC.
30 Bay St.
Staten Island, N.Y. 10301
(212) 447-4911
Telex 429394
TWX 710-688-6738

BUY - SELL
LEASE
IBM
32 SYSTEM 34
303X
370
AVAIL. NOW
Call Collect:
404-252-7480

All IBM Peripherals
1403 3340
3277 3350
3203 3420
3211

DATAMARC
6065 Roswell Rd.
Suite 320
Atlanta, GA 30328

SHORT TERM LEASES

138's, /148's, /158's, /145's
3330's, 3350's, 3420's
360/40's, /50's, /65's

Call Us Collect

UNITED STATES

Boston: Eastern Regional Headquarters	**(617) 272-8110**
Arlington	(703) 521-0300
New York	(212) 832-2622
Philadelphia	(215) 293-0546
Austin: Southern Regional Headquarters	**(512) 451-0121**
Atlanta	(404) 768-6535
Dallas	(214) 233-1818
Houston	(713) 447-0325
Chicago: Central Regional Headquarters	**(312) 298-3910**
Pittsburgh	(412) 922-8920
Detroit	(313) 961-1675
Minneapolis	(612) 370-1153
St. Louis	(314) 353-8285
San Francisco: Western Regional Headquarters	**(415) 283-8980**
Los Angeles	(213) 670-7994
CANADA Toronto	**(416) 366-1513**

BROKER/DEALER SALES AND LEASING

168, 303X	Chuck Smith
135, 145, 155	
138, 148, 158	Dave Revere
Peripherals	Keith King
Communications & Terminals	Craig West
OEM Memory	George Beck
360	Sandy Mitchell

Phoenix: (602) 248-6848

GREYHOUND
COMPUTER CORPORATION
800-528-6113
Greyhound Tower, Phoenix, Arizona 85077

WE BUY - SELL
USED OEM
PERIPHERALS
and
WANG LABS
EQUIPMENT
CFR Associates, Inc.
18 Granite St.
Haverhill, MA 01830
617/372-8536

For Sale By Owner
IBM
SYSTEM 32
32 KB memory
13.7 MB disk
155 LPM printer
$14,500
Call Ed Stavenick
Republic Metal
201/376-7200

H•P
BUYING-SELLING
3000 SYSTEMS
2000 SYSTEMS
1000 SYSTEMS

CRISIS COMPUTER CORP
2358 Walsh Ave., Santa Clara, CA 95051 (408) 727-0431
For domestic and international sales TWX 910 338 7330

Series/1
5120
BUY • SELL • LEASE

COT
COMPUTER OPTIONS, INC.
The Best Option in IBM Computers

Parkdale Plaza Bldg. #540W
1660 So. Highway 100
St. Louis Park, MN 55416
612 • 540 • 8660
800 • 328 • 5718

SALE PURCHASE

DATA GENERAL
COMPUTER SYSTEMS & PERIPHERALS
FOR SALE

8053/D100/0200 CRT's	S/130 w/Floating Point
D200 w/Print Option	6021 Magnetic Tape System
6060 Disk System	DCU-50 w/CRC
6030 Diskette System	Comm Chassis
MICRONOVA System 50% Off	ALM-8
NOVA 4/X w/256KB Memory	SLM-2
6045 10MB Disk System	6040 Printer

AMES SCIENCES, INC.
301/397-3140

PRIME 300
128K memory
80MB disk
300 lpm printer (uc/lc)
Terminet 30 console
16 asynchronous lines standard software +
2780 emulation
FOR SALE/ASSUMPTION
MAKE OFFER
CONTACT
R.J. RUDMAN
313/556-9492
GENERAL MOTORS CORP
485 W. MILWAUKEE EA-486
DETROIT MI 48202

FOR SALE BY OWNER
IBM System 3
Model 12
5412/C20 CPU 96K
dual program and LDA
3340/C02 Disk storage
5203/003 Printer 300 LPM
5471/001 Printer Keyboard
3741/001 Data Station
Directly attached
Contact:
David Stuienrath
(313) 843-1211

FOR SALE BY OWNER
UNIVAC 1100/10

1	Central Processor
4	Channels
196	KW Memory, with Performance Enhancement
1	Console with Hard Copy
1	Multy Subsystems Adapter

Available March, 1981
Call:
David G. Zambrano
55-53-38
54-04-29
SERVI-DATA, S.A. DE C.V.
P.O. Box 1955
Monterrey, N.L. Mexico

buy sell swap | buy sell swap | buy sell swap | buy sell swap | buy sell swap

CMI

AMERICA'S LEADING SPECIALIST SERVING THE USED MARKET

3033 Lease Financing and Purchase Leaseback New and Used Jack Shevillo

WANT TO BUY 3032 With 3850 September/October Jack Shevillo

3031 Lease Sale Purchase/Leaseback Bob Laurie

WANT TO BUY 3031 Any Memory Size September/October Bob Laurie

3168 Short Term Leases Features/Memory Gary Smith

SYSTEM 3 Models 12 and 15 Dennis Pennington

3158 A/P's Several Models Available Bill Graham

3148 3138 Lease or Sale Immediate Delivery Bob Laurie

4341 We Want to Sublease Your Machine We have late '80 Delivery Positions Don Dupuis

3155 3145 3135 3125 Buy/Sell/Lease Joe Romeo

COMMUNICATIONS Buy-Sell-Lease IBM 3705 IBM 3704 Immediate Delivery Configured To Your Requirements Joe Romeo

SYSTEM 34 All Models, Upgrades and Peripherals **SERIES 1** Forest Benaway

3276 3274/3278 3287/3289 Kay Richard

3880 3420 3370 3411 3350 3203 3340 3211 Buy/Sell/Lease Pat Callahan

IBM DISKS TAPES Purchase/Leaseback New and Used Pat Callahan

CMI CORPORATION Since 1969

755 W. Big Beaver, 19th Floor, Troy, Michigan, 48084

(313) 362-1000

MARKETING
Dallas, Texas (214) 385-0806
New Jersey (609) 645-7282
Montreal, Quebec (514) 288-8455
Windsor, Ontario (519) 258-8910
Geneva, Switzerland Telex: 289073 CMI CH
Paris, France Telex: 613910 CMI FR
Hamburg, W. Germany Telex: 211897 CMIHH D

CMI FINANCIAL SERVICES
San Francisco (415) 392-4800
Atlanta (404) 396-7575

Member CDA / CLA

DEC

Specialists in DEC Systems and DEC Compatible Add-Ons

DRP06-200MB	$14,995	DRWM05-300MB	$25,995
DRJP06-200MB	$21,995	DZ11's-Many-From	$ 1,495
DRWP06-200MB	$23,995	128KB MOS	$ 2,395
DRM02-3-80MB	$ 8,995	256KB MOS	$ 3,995
DRJM02-80MB	$15,995	DTU45 & Controller	$ 9,995
DRWM03-80MB	$17,995	M7850-Many	$ 595
DRM04-5-300MB	$16,995	Systems-Many-34-70's	
DRJM04-300MB	$23,995		

DATA SYSTEMS SERVICES

22642 Lambert Suite 406 El Toro, CA 92630 (714) 770-9024

Buy-Sell-Lease

Sale or Lease New

TEXAS INSTRUMENTS

990-Based Computer Systems

Typical Configuration:
- 990/10 CPU with 224 K Bytes
- 2 CDS 200 MB Disk Drives
- 4 TI 911 VDT's
- 300 LPM Printer
- DX10 T/S Operating System
- Sort/Merge, System Utilities
- 1 Compiler (RPG II, COBOL, FORTRAN, BASIC or PASCAL)
- AUTOFORM Data Entry System
- Two Weeks Training at MDS

Price – $77,500 plus tax, freight and installation

TI field service available

Call us to discuss other configurations, peripherals, terminals and conversion from your present computer.

IMMEDIATE DELIVERY for most configurations, including 990/12 CPU.

Manufacturing applications including BOMP, MRP, Production Control, etc., also available.

Call (213) 640-0404

Mini Data Systems
2041 Rosecrans Avenue
El Segundo, California
90245

SYSTEM 3-32-34-38

SERIES 1-5110

WANT TO BUY ANY SYSTEM 34

Available: S34-E35-E34-C23-C24-D35 5251-11, 5251-12, 5256-03

Communication: 3271, 3272, 3277, 3284 3284, 3286, 3288, 3776 3777, 3780, 3704, 3705

Peripherals: 3741, 3742, 129, 029, 059 3715, 3717, 083, 514, 548 3410, 3411, 3340, 3344

GENE NICHOLL TOM KLEEFISCH

AMERITEX COMPUTER CORP.
14229 Proton Road
Dallas, Texas 75234
214/934-9151

3270's

AVAILABLE FOR SALE OR LEASE

3271/3272 CONTROLLERS
3277 DISPLAY STATIONS
3284/3286/3288 PRINTERS

3274 CONTROLLERS
3278 DISPLAY STATIONS
3287/3289 PRINTERS

NF COMPUTER SALES & LEASING CORP.
1211 W. 22nd St., Suite 424, Oak Brook, Il. 60521
Telephone 312-920-8181, Telex 206106 NFC OAKR

Inflation Fighters

Quality & Savings

Slightly used, Money Back Guarantee. Full Reels. All External Labels Removed Guaranteed for use at 1600 BPI through 6250 BPI.

2400' Reel	$4.95 ea.
1200' Reel	$4.25 ea.
600' Reel	$3.50 ea.

All Tapes with Hanging Seals
We pay freight on orders over 200 tapes
All orders shipped within 48 hours

Call or Write
Computer Tape Mart
169 B New Highway
Amityville, New York 11701
(516) 842-8512

SALE or LEASE (We're sole owners)

IBM 4341 Model L (Avail 1/81)

2X10 IBM TAPE SYSTEM
- 3420/005's & 3803/001's Avail. 11/80
- HI-SPEED I/O Set Make offer
- 3742 DATA SYST. From $3,295.00 or $135.00 per mo.
- System 38 Avail. 11/80
- IBM 3033N Avail. 12/80
- 029 All Models from $1575
- 129-3 from $2850

CALL GEORGE GILMAN

I.O.A. DATA CORP.
Toll Free 800-221-8438
N.Y. (212) 673-9300
383 Lafayette Street, New York, N.Y. 10003

buy sell swap | buy sell swap | buy sell swap | buy sell swap | buy sell swap

CIS IBM amdahl®

all systems, New and Preowned. Buy, Sell, Lease, Trade.
Phone 315/425-1900
"A deal without talking to CIS is no deal at all."

3168 U38 available, attached processor
3031 Lease or sale
S/38, S/34 Delivery positions available
3032 Want to buy
4300 Lease financing, attractive rates
3033 Lease financing, new or used
370s All types, models
3158 All models, memory, features
Peripherals IBM & OEM, buy, sell, lease

CIS The worldwide full-service leader
600 MONY Plaza, Syracuse, NY 13202
(415) 956-3040 TLX: 8586367
San Francisco, CA
Dusseldorf, West Germany TLX: 36585
Fribourg, Switzerland TLX: 202714
Paris, France TLX: 26025
Brussels, Belgium TLX: 2322495
Tokyo, Japan
Member CDA, CLA

BROOKVALE ASSOCIATES DEC
BUY • SELL • RENT • TRADE

DH11-AA w/DBs 16-Line MUX	11/03-LK 64KB MOS
DU11-DA Sync Intf	11/23-AA 128Kb MOS
KG11-A Comm Arith	11/34-HM 16KW Core
LA120-DA Hard copy Term	11/34A-DE 16KW MOS
MS11-LB 128Kb MOS 11/34A	11/40 16KW Core
MK11-BE 128Kb MOS 11/70	11/45 32KW Core
RK07-EA 28Mb Drive	11/70-VK 128Kb MOS

(800) 645-1167 • NEW YORK (516) 567-7777
40 ORVILLE DRIVE • BOHEMIA, NEW YORK 11716



CALL JIM LUNCEFORD, 913/381-7272

L&A — 11 YEARS IN THE DEALER/LESSOR LEADER
FOUNDING MEMBER OF COMPUTER DEALERS ASSOCIATION

L & A Computer Industries, Inc.
Fox Hill Office Park, 10855 Granada, Overland Park, Ks. 66211

SAVE ON IBM COMPUTERS



- Save thousands of dollars
- Deliver quickly
- Take trade-ins

We specialize in full systems, up- grades, or add-on parts. System/34 System/32 System/3 We buy IBM equipment whether owned, or rented from IBM.

Cass Marketing Services Inc.,
535 N. Brand Boulevard, Glendale, Calif. 91203
(213) 956-4982 • (800) 423-2662 Toll Free Outside Calif.

dataserv
Your Authority in the IBM Second Market

Call Dataserv when you need to know Second Market equipment values, market conditions or answers to other questions. People who know Dataserv trust Dataserv. We help you get maximum satisfaction with Second Market transactions. If the equipment you want to buy, sell or lease isn't listed, call our toll free number.

GSD SYSTEMS

SYS 3	SYS 32	SYS 34	SYS 38
Short Term Lease Avail	Sale or Lease All models	All models New or Used	Over 50 Def. Pos. Avail.

DPD SYSTEMS

125	138	4331	3031
135	148		
145	158	4341	3032
155	168		3033

Memory available for all IBM Processors

PERIPHERALS

3330	3410	3203	1403
3340	3411	3505	1442
3350	3420	3525	2501

All peripherals available on short or long term lease

1255	1419	3880
All models Sale or Lease	On Line or Off Line Lease Sale	Avail. now Flexible Terms

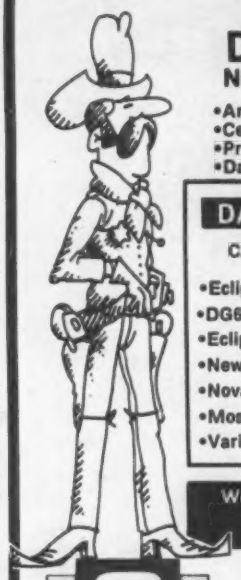
dataserv CALL TOLL-FREE 1-800/328-2406
Your Authority in the IBM Second Market IN MINNESOTA CALL COLLECT 612/544-0335
DATASERV BUILDING, 9901 WAYZATA BOULEVARD, P.O. BOX 9488, MINNEAPOLIS, MN 55440

HOW FAST ARE WE?

.... Call Us Now!

Most Equipment In Stock For Immediate Delivery

Buy • Sell • Trade
DATA GENERAL • DEC
New Or Used Systems And Upgrades



- •Ampex
- •Century Data
- •Printronics
- •Data Products
- •Tanberg
- •CDC
- •Soroc
- •Hazeltine
- •Diablo
- •Centronics
- •Western Dynex
- •GE

DATA GENERAL		DEC	
CALL STEVE DWYER		CALL JOHN HOLAK	
•Eclipse 128W	6400.	•New VT100's	1725.
•DG6045 Controllers	1500.	•New MS 11LB	3900.
•Eclipse 32W MOS	1800.	•New MS 11LD	5800.
•New D/100, D/200 Qty. Disc.		•MS 11 JP	695.
•Nova 3/12, 4C, 4S, 4X Sys.		•Various Modules	Stock
•Mostek Compatible Memory		•LA 120, LA 180	Stock
•Various DG Modules	Stock	•Various DEC Modules	Stock

We repair Data General and DG Compatible Peripherals.
Call Blaise Leeber
Panic Service • 24 Hour Turn-A-Round

Computer Resale Consulting Inc.

490 West Main St., Avon, MA. 02322

Call George Trawinski (617) 583-6460
Out Of State Call 800-343-1092
TWX/TELEX 7103451290

Short or Long Term Leases From RANDOLPH

4300's
303X

...and all 370 CPU's and peripherals



800-243-5307

Randolph Computer Company
Division of The Bank of Boston
537 Steamboat Rd., Greenwich, Ct 06830
(203) 661-4200

DEC TERMINALS NOW
Immediate Delivery

DEC VT100 **DEC LA120**

FOR SALE OR LEASE

Datalease Terminals & Communications

800-854-0350
IN CALIF.
714-632-6986

2770 REGAL PARK DR., ANAHEIM, CALIF. 92806

DTC is a DATALEASE company

EQUIPMENT AVAILABLE

Description	For Sale/ Lease	Date
370/168		
168-L	lease only	11/30/80
2860-3	lease only	now
370/158		
158-U32 (ISC and Madrids)	lease only	now
158 Memory-1 meg (CDC)	sale or lease	now
3058 for 158	sale or lease	now
1435, 1850, 2150, 6111, 7730, 7840, 3213	sale or lease	now
370/145		
145-I (6982, 7855, 3345, 3046, 8810, 3215)	sale or lease	12/09/80
6983, 6984	sale or lease	now
370/135		
135-FEO (4670, 4672, 7855)	sale or lease	10/28/80
Memorex Memory	sale or lease	10/28/80
370/125		
125-H00	sale or lease	10/01/80
Other		
2835-2	sale	10/17/80
2305-2		

CONTACT:

LFC

Jack A. Northrop
Lease Financing Corporation
3 Radnor Corporate Center
100 Matsonford Road
Radnor, Pa. 19087
215/527-4450

DEC VAX

Systems Memories Peripherals

Immediate Short Term Deliveries

call
BROOKVALE ASSOCIATES

800/645-1167 516/567-7777

DEC EQUIPMENT FOR SALE

RP06 RP05 RP04 RM03 RM02
RM07 RK06 RK05 RL02 RL01

Controllers available for VAX, 11/70 and other PDP-11's.

Processors:	11/70, 11/60, 11/45, 11/34,11/23
Memory:	MK11-BE, MK11-CE, MS11-LD, MS11-LB
Tape:	TWE16, TU10
Printers:	LP11, LA180
Terminals:	VT100, VT52, LA120, LA36
Comm:	DZ11-A, DH11-AD
Card Rdr/Pun:	CTS11-KM
Backplanes:	DD11-DK, DD11-CK

Carl R. Boehme & Assoc., Inc.
Specialists in Digital Engineering
426/727-2686

MINICOMPUTERS & SYSTEMS TO YOUR SPECS
CALL FOR PRICES!!

- ** New & Used Nova 4 Systems - Available Now ..... 20-30% Below List
- ** New & Used Nova 3/12's and Nova 3 Systems ..... To 40% Below List
- ** New DEC 11/23's and 11/23 Systems ..... Available Now
- ** New Word Processing & Accounting Software ..... Call for more info

** HAVE BUYERS FOR: NOVA 2/10's and ECLIPSE; DEC 11/04's and 11/34's and 11/05's

Many other computers, peripherals, and components. New and Used.

CALL TODAY (408) 733-4400

minicomputer exchange inc.

BUY & SELL

WORD PROCESSORS
WANG

DEC • IBM

Call John MacMahon
(617) 261-1100

AMERICAN USED COMPUTER
P.O. Box 66, Kenmore Sta., Boston, MA 02215

PURCHASE/SALE/LEASE
ALL 360 & 370 SYSTEMS



CORPORATE COMPUTERS, INC.
115 Mason St., Greenwich, Conn. 06830 (203) 661-1500
Member Computer Dealers Association

buy sell swap | buy sell swap | buy sell swap | buy sell swap | buy sell swap

S/32
S/34
S/3
S/38

BUY • SELL • LEASE

COI

COMPUTER OPTIONS, INC.

The Best Option in IBM Computers

Parkdale Plaza Bldg #540W
1660 So. Highway 100
St. Louis Park, MN 55416

612 • 540 • 8660
800 • 328 • 5718

COMDISCO®

Your First Choice In The Second Market

IBM PROCESSORS

- ☐ 4331 Systems available now
- ☐ 3135 Any configuration
- ☐ 3138 Immediate Sale or Lease
- ☐ 3145 One Meg Systems
- ☐ 3148 Short term Lease
- ☐ 4341 Systems for Lease w/3370 4th Quarter Deliveries
- ☐ 3155 4 Meg Model II now
- ☐ 3158 All sizes — short term leases
- ☐ 3165 Best Price Performance
- ☐ 3168 Systems available now
- ☐ 3031 Lease or Sale
- ☐ 3032 Systems available now
- ☐ 3033 U or N Models
- ☐ 470 V6-II available now
- ☐ 2880-2 Lease or Sale
- ☐ Memory IBM or independent Call Rosemary Geisler, 312/698-3000
- ☐ 3704/05 Immediate delivery Karen Johns, 312/698-3000
- ☐ 327X Call John Christopher, 312/698-3000

FEATURES
Most features available from inventory

- ☐ 3330/40 Available Sale or Lease
- ☐ 3350 Immediate delivery
- ☐ 3420 Models 3, 4, 5, 6, 7, 8 immediate delivery
- ☐ 3880 4 Channel Switch machines immediate availability. Sale or Lease

We Can Put It Together

Branch Offices
Domestic

Atlanta	404/256-5956
Boston	617/542-4005
Chicago	312/698-3000
Connecticut	203/853-6966
Fort Worth	817/534-1774
Michigan	313/644-1500
New Jersey	201/568-9666
San Francisco	415/944-1111
Washington, D.C.	301/441-1000

International
Latin America

(Florida)	305/266-5682
Toronto	416/498-7220
Paris	297 2000
Switzerland	021/71 09 35
West Germany	(2434) 3948

Corporate Headquarters
Comdisco, Inc.
8400 Shafer Court 312/698-3000
Rosemont, IL 60018 TWX — 910-253-1233

MEMBER CDA/CLA

DEC

OR EQUIVALENT

HAVE IT YOUR WAY
BUY-SELL-LEASE

Check these savings on equivalents

OUR PART #	DEC PART #	DESCRIPTION	DEC LIST	OUR LIST
WJM02	RJM02	80 MB DISK AND CONTROLLER	25700	15500
WWM03	RWM03	80 MB DISK AND CONTROLLER	26800	17500
WM02/03	RM02/03	80 MB DISK (SLAVE)	19300	8500
WJP06	RWP06	200 MB DISK AND CONTROLLER	44000	21500
WWP06	RWP06	200 MB DISK AND CONTROLLER	44000	23500
WP06	RP06	200 MB DISK (SLAVE)	34000	14995
WJM04	RJM04	300 MB DISK AND CONTROLLER	N/A	23500
WWM05	RWM05	300 MB DISK AND CONTROLLER	N/A	25500
WM04-05	RM04-05	300 MB DISK (SLAVE)	N/A	16500
WTJ45	TJE16	45 IPS TAPE AND CONTROLLER	20200	8100
WTJ75	TJU45	75 IPS TAPE AND CONTROLLER	24600	10000
WTJ125	TJU77	125 IPS TAPE AND CONTROLLER	30000	11990
WH960	H960	CABINET FOR TAPE DRIVES	1800	1500
WMS11-LB	MS11-LB	128KB MOS MEMORY	4300	2100
WMS11-LD	MS11-LD	256KB MOS MEMORY	6400	4250
WDD11-CK	DD11-CK	FOUR SLOT BACKPLANE	440	350
WDD11-DK	DD11-DK	NINE SLOT BACKPLANE	880	750
WDD11-PK	DD11-PK	NINE SLOT PROC. BACKPLANE	880	750
WM9312	M9312	BOOT/DIAGNOSTIC/TERMINATOR	880	750
WM8302	M8302	UNIBUS TERMINATOR	110	100
WDL11-W	DL11-W	SERIAL INTERFACE	920	700
WLP11	LP11	LINE PRINTER CONTROLLER	770	650

COMMISSIONS PAID ON SALES

(408) 732-4523

WEX West Coast Computer Exchange Inc.
248 Sobrante Way, Sunnyvale, CA 94086

XEROX USERS

WE
BUY - SELL - REPAIR

- COMPUTER SYSTEMS
- PERIPHERALS
- SUBASSEMBLIES AND SPARE PARTS

Call toll free
800-423-5321 Ext. 14 or 15
in California
213-889-6031 Ext. 14 or 15

TYMSHARE®
Equipment Support Division

BUY...SELL...LEASE



IBM System 38
IBM System 34

• All Peripherals for Both Systems

DOXCEL Leasing Corporation
1250 Broadway, New York, N.Y. 10001 (212) 279-1717
5100 Augusta Drive, Houston, Texas 77057 (713) 975-0000

WE BUY, SELL, LEASE IBM®

SADDLEBACK MARKETING CORPORATION

1400 NORTH BRISTOL, SUITE 170
NEWPORT BEACH, CA 92660
PHONE: (714) 833-9800
TWX: 910-595-2550

WANTED

3138-J BUY ONLY
3505/3525; 1421

3420-6's, 7's, or 8's

3540-B2 Diskette Reader
3803-1 Will Swap 3803-1; 3551
HI SPEED I/O SET

SALE

3420-5; 6631 3420-7; 3551
3505-B1 NO FEATURES

SALE OR LEASE

Memorex Disks & Controller
(3657's, 3673, 3672)
4331-I; w/3310's; 8809; 3203-5; 3278's
3340-A2's, 3340-B2's, 3830-2



Contact: Bernie Gest
(215) 782-1010
7704 Seminole Ave.
Melrose Park, Pa. 19126

Computer Marketing Inc.

4341 - FULL SYS - FEB.

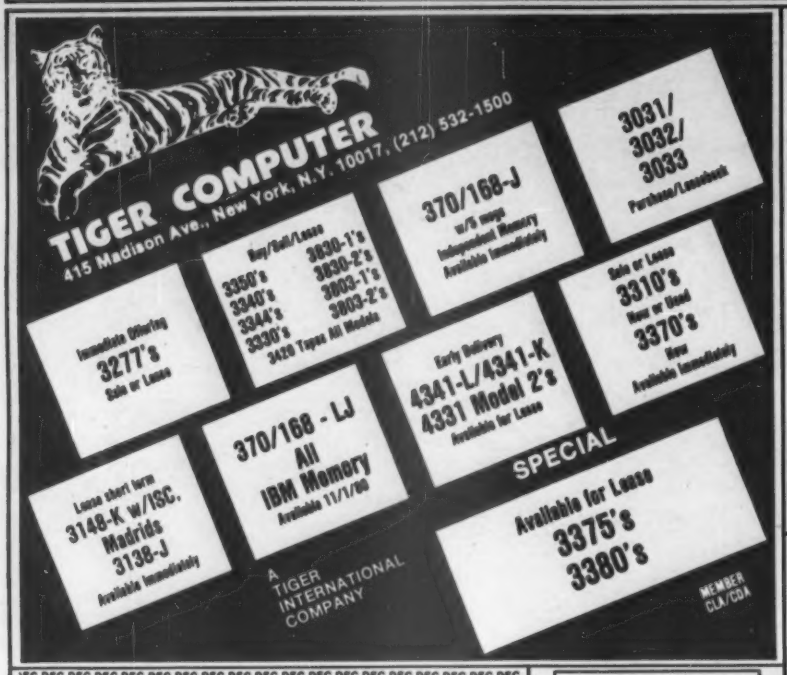
IMMEDIATE DELIVERY

3274-1C CONTROLLER
3203-2 & 5 PRINTERS
3274/3276/3278's

WANTED

DISKS — TAPES — PRINTERS

buy sell swap | buy sell swap | buy sell swap | buy sell swap | buy sell swap



EFM GROUP

For Sale or Lease

4341K or L + PERIPHERALS 11/80, 12/80, 1/81
370/145 Various Models now
370/148J with ISC-lease only
370/135FE with up to 512K ANS now
370/115 256K now-$5,000
2821-5, 2821-2, 1403-2 10/1
2821-1, 1403-N1 10/15
1403 N1, 2540-1, 2821-5 11/1
DEC Unibus Subsystem 30 day avail.

WANT TO BUY

3420-4, 6, or 8
3350- any model

Member of CDA & CLA

Bob Stevenson/Chuck Stabile
Nick Schultz
3000 Marcus Avenue
Lake Success, N.Y. 11042
516-488-7870

AVAILABLE FOR LEASE

SYSTEM/3 MODEL 15D

Includes
3277, 3340, 1403—650LPM,
96K-5415, 5424, 3741 D/A, BSCA

Priced to move fast . . .
Available January 1981

Contact
R.D. Barbagli
(914) 666-2121

DEC DISK DRIVES NOW AVAILABLE

4-RWP06AA	37K	2-RJP04	15K
6-RP06AA	29K	5-RWP04	15K
12-RWM03AA	19K	5-RP04	10K
8-RM03AA	14K	3-11MK-CE	18K
2-RJM02AA	20K	2-MJ11-BA	15K
4-RM02AA	16K	DT JU45	9K
		DT JU75	14K
		DT JU125	17K

DATA SYSTEMS SERVICES
22842 Lambert
Suite 408
El Toro, CA 92630
(714) 770-9024
Buy-Sell-Lease

CENTRONICS
501 PRINTERS
$895

TEKTRONIX
4631 & 4632
HARDCOPY UNITS
$3495

Call or Write
for price list

(408) 379-9120
romelan industries, inc.
5089 Vandel Way • Campbell, CA 95008

DEC 310 System
with 3 RKOS Drives
7,500 and take over lease
outright purchase
considered
End-User inquiries invited
Contact:
Computer
P.O. Box 174
Spring Valley, CA 92077
(714) 466-3222

IN STOCK CLEARANCE

Nova 3 8K SC memory	$ 750
Nova 800, 1200, 2, 3, 16 core mem.	$1,250
Nova 3 CPU's	$1,250
Nova 3-12	$2,500
BASIC Cassette I/O	$ 200
Eclipse MMPU1 (S130)	$2,000
Quad Mux	$ 500
Nova 2, 4K core mem.	$ 350
Hi-speed paper tape reader w/controller	$1,100

PSI
230 Second Ave.
Waltham, MA 02154
617/890-4070

CMG
375 New Boston Park
Woburn, MA 01801
617/933-8144

WE BUY/SELL/TRADE any quantity

D.G. H.P. DEC T.I. others

Let us know what your computer needs are. If we can't help you, we'll tell you who can.

PINZONE & ASSOCIATES
3322 STOVALL STREET
IRVING, TX 75061
800 527-3723
214 252-7454

COMPUTER RESALE CONSULTING
490 W. MAIN ST.
AVON, MA 02322
800 343-1092
617 583-6460
Telex 710 345-1290

VERDUGO
4400 SAN FERNANDO RD
GLENDALE, CA 91204
213 246-4915

A S I
44 MAIN ST. SUITE 203
CHAMPAIGN, IL 61820
217 351-7982

Call our nearest office for quotes

THE COMPUTER SYNDICATE

COMPUTER ACQUISITIONS COMPANY CAC

FOR SALE

3370-A1
(3) 3370-B1
AVAILABLE 10/17

6065 ROSWELL RD., SUITE 5C2/P.O. BOX 76787
ATLANTA, GA 30328 / (404) 255-7080

IBM Unit Record Equipment
Disk Packs and Data Modules

Mach	Sale	Lease
026	$ 750	$35/mo
029	Call	$45/mo
082	$ 750	$35/mo
083	$1700	$60/mo
084	$2750	$125/mo
085	$1200	$60/mo
088	$2750	$125/mo
129	Call	$110/mo
548	$1500	$ 60/mo
557	$3500	$125/mo
3742	$3500	$175/mo
360/20		Offers

Pack	Sale	Lease
1316	$ 30	—
2316	$ 99	—
3336-1	$149	$10/mo
3336-11	$299	$20/mo
3348-70	$799	$60/mo
Cartridge	$39	—

Other machines, packs, also available.

Thomas Computer Corporation
600 North McClurg Court, Chicago, IL 60611 (312) 944-1401

4341—L

OUR OWN POSITIONS
10-3-80 12-26-80
2-20-81
CENTRON-DPL
612-884-3366

DEC
FOR SALE
PDP 11/23 or 11/03 System
Dual RL01 disk drives
Quad serial
VT-52
RT-11
Fall Delivery
ALSO
11/23 CPU Boards IN STOCK
Contact Glenn Dollar
RAINBOW COMPUTING INC.
9719 Reseda Blvd., Northridge, CA 91324
213/349-5560 Tuesday-Sunday

buy sell swap | buy sell swap | buy sell swap | buy sell swap | buy sell swap

DIEBOLD
COMPUTER LEASING
BUY•SELL•LEASE

ALL CPU's & PERIPHERALS

360 303X
370 4300 Series

IBM
CARD READERS & PUNCHES
PRINTERS
CONTROLLERS
AVAILABLE NOW

CALL **DIEBOLD**
800-631-1602 201-569-3838
TWX 710-991-9733

177 North Dean Street, Englewood, New Jersey 07631
Member: Computer Lessors Association and Computer Dealers Association

GREYHOUND...
wherever you need us, we are there.

Greyhound Computer Corporation has offices in a dozen U.S. cities and at six international locations to bring our computer leasing equipment, experience, people and resources direct to you. Call us for all your computer leasing needs today.

UNITED STATES

Arlington	(703) 521-0300
Atlanta	(404) 768-6535
Austin	(512) 451-0121
Boston	(617) 272-8110
Chicago	(312) 298-3910
Dallas	(214) 233-1818
Detroit	(313) 961-1675
Houston	(713) 447-0325
Los Angeles	(213) 670-7994
Minneapolis	(612) 370-1153
New York	(212) 832-2622
Philadelphia	(215) 293-0546
Pittsburgh	(412) 922-8920
St. Louis	(314) 353-8285
San Francisco	(415) 283-8980

INTERNATIONAL

Dallas . . . . Greyhound Computer Overseas Corporation	(214) 233-1818
Geneva	22-81-27-54
London	1-891-4986
Paris	1-256-33-64
West Germany	89-85-10-59
Mexico	(905) 543-6850

CANADA

Toronto	(416) 366-1513
Montreal	(514) 281-1925

GREYHOUND COMPUTER CORPORATION
800-528-6113
Greyhound Tower Phoenix, Arizona 85077

FOR SALE OR LEASE!
LONG OR SHORT TERM!
LOW MONTHLY RATES!

60 3277-2's
CONTROLLERS AND PRINTERS
ANY TYPE KEYBOARD
(214) 258-0541

WE OWN WHAT WE SELL!

TWX 910-860-9285
METROPLEX COMPUTER COMPANY, INC.
320 Decker Drive • Suite 180
Irving, TX 75062
MEMBER CCA

Dealers in: **IBM** PROCESSORS/PERIPHERALS

3/32 34/38 360/370 4300 303X SERIES 1 33XX 38XX

data3 computer corporation
CALL TOLL FREE
1-800-328-3537

FOR LEASE

SYSTEM 3/15-D26

AVAILABLE
10-15-80

FLEXIBLE TERMS

JMS COMPUTER ASSOCIATES
7 Roswell St.
Alpharetta, Ga.
404/475-1000
Call Greg Miesse

Member Computer Dealers Association

IDS international data services, inc.

DEC SYSTEMS
PDP 11/70's,
11/34's, 11/04's,
11/03's & Peripherals
BUY & SELL

(408) 738-3368
telex 345 592
1020 Stewart Drive
Sunnyvale, CA 94086

TO: BUY, SELL, OR LEASE

DISK **ITEL** TAPE

CALL OR WRITE
COMPUTER SYSTEMS/GRAPHICS
2017 W. 104th
Leawood, KS 66206
TOM LYNN 913+649-2190

- MEMOREX PERIPHERALS
  Buy, Sell or Lease
- EQUITY AVAILABLE

PCL FINANCIAL CORP.
239 Glenville Road
Greenwich, Conn. 06830
(203) 531-4800
Edward J. McKelvey

FOR SALE OR LEASE

SYSTEM 3/15
MODEL D24-256K
SERIAL # 41028

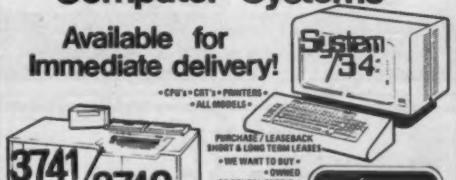
COMMUNICATIONS FEATURE
CHOICE OF PRINTERS
3741 AND 3277'S
3340 DISK
5424 MFCM

AVAILABLE NOW
WILL MODIFY TO SUIT

Computer Merchants inc
75 South Greeley Avenue, Chappaqua, New York 10514
Member Computer Dealers Association (914) 238-9631

We·buy·sell·and lease·Computer Systems

Available for Immediate delivery!



• CPU's • CRT's • PRINTERS •
• ALL MODELS •

PURCHASE / LEASEBACK
SHORT & LONG TERM LEASES
• WE WANT TO BUY •
• OWNED OR RENTAL CREDIT •
• IMMEDIATE CASH •

• ALL MODELS
• PRINTERS (3715 and 3717)
• AVAILABLE IMMEDIATELY
• MANY IN STOCK

We buy & sell
CALL: •STEVE HOUGH
•DICK GEYER

Pearl EQUIPMENT CO., INC.

PEARL EQUIPMENT COMPANY, INC.
P.O. BOX 24888 • 4717 CENTENNIAL BLVD. • (615) 383-9700 • NASHVILLE, TN 37202

buy sell swap | buy sell swap | buy sell swap | buy sell swap | buy sell swap

This announcement appears as a matter of record only

$63,713,000
HIGH TECHNOLOGY EQUIPMENT

In the first six months of 1980
the undersigned has arranged debt and equity
and placed this equipment in service.

F/S Computer Corporation

An Asset Management Company of
FSC Corporation
(OTC:FSCC)

October 6, 1980

WANT TO BUY
Quantity 3420/006 with feature 6425 (Dual Density)

Contact C.C. Elders
DAC Buys Rental Credit Equipment
Call or Write
DATA AUTOMATION CO, INC.
4858 Cash Road
Dallas, Texas 75247
214/637-6570
Member of Computer Dealer Association

BOARD REPAIR

- DEC • Teletype
- 90 Day Limited Warranty on all work.
- Fast Turnaround, add 50% for 1 day service.
- Our 9th Year

Sample prices for one week turnaround:

- LA120 Logic Board..... 74.00
- LA36 Logic Board 58.00
- LA34 Logic Board 57.00
- Teletype 43 Logic Board 48.00
- Teletype 43 Power Supply ... 57.00

AMERICAN TELEDATA
7100 Broadway Suite 1A, DENVER, COLORADO 80221
Albuquerque • Austin • Colorado Springs • Dallas • Denver • Honolulu • Little Rock
Minneapolis • New Orleans • Phoenix • Portland • Salt Lake • San Antonio • Tucson

800-525-8105 Contact Mr. Ward

AMPEX USERS

WE
BUY - SELL - REPAIR
- DIGITAL TAPE DRIVES
- DISK DRIVES AND RELATED ASSEMBLIES

Call toll free
800-423-5321 Ext. 11
in California
213-889-6031 Ext. 11

TYMSHARE®
Equipment Support Division

AVAILABLE
138's
148's

RANDOLPH Computer Company
Division of The Bank of Boston
537 Steamboat Road
Greenwich, Ct. 06830
800-243-5307
(In Connecticut, 661-4200)
Member CLA Computer Leasers Association

DEC SPECIALS
BOARDS IN STOCK

DU 11-DA	....	$1250
KG 11-A	....	$1,000
DR 11's Stock		....
KW 11P	....	$500
FP 11B	....	$2,500

DATAWARE
SYSTEMS LEASE, INC.
30 Bay St.
Staten Island, N.Y. 10301
(212) 447-4911
Telex 429304

PDP 11/04 DM

SWA South West Automation
BUY-SELL-SWAP
HOME OFFICE
1113 Ave., B - P.O. Box M
Katy, Texas 77449
(713) 371-9288
WEST COAST OFFICE
1175 Tasman Drive
Sunnyvale, Calif. 94086
(408) 734-1117

DATA COMPUTER EQUIPMENT, Inc.
4050 Nathan Lane No., Minneapolis, MN 55441



NATIONAL DEALER/BROKER
IBM SYSTEM 3-32-34-38
PURCHASE OR LEASE
GET "TOP PRIORITY" ACTION...
CALL ME COLLECT!
612/559-4379
Loren Page
Marketing Manager

SPECIAL SALE
REMANUFACTURED EXECUPORTS

Quiet, Portable, Reliable
Data Terminals
Built-in Acoustic Coupler/Modem
and Carrying Case

Models		Price
300	80 Print Positions w/90 Day Factory Warranty	$795
3000	80/136 Print Positions With Plotting Capabilities w/One Year Factory Warranty	$1195

CALL NOW FOR IMMEDIATE DELIVERY:
(201) 261-6800
See us at Info 80-Booth #1300
P.O. Box 15 • East 96 Midland Avenue • Paramus, NJ 07652 •

CTSI
Computer Transceiver Systems Inc.
Manufacturers of Execuport® Terminals

DEC COMPUTER SYSTEMS AND COMPONENTS for VAX 11/780

C.D. SMITH & ASSOC. INC.
12805 EAST FREEWAY, SUITE 318
HOUSTON, TEXAS 77015
713/451-3112
TELEX: 76-2547 CD Smith Hou

370-145
All Models for Lease
Very reasonable
Brixton
516/248-0250

BUY • SELL • IBM
2914-1
CHANNEL SWITCHES

COMPUTERS AND PERIPHERALS INCORPORATED
P.O. Box 306 Westwood, Mass. 02090
CALL (617) 329-9800

IBM S/32
Model B-34
14K
13.6 mgb disk
155 LPM
Has been under IBM maintenance since purchased in 7/75.
Custom Rubber Products, Inc.
P.O. Box 11100
Houston, TX 77016
713/691-2211

Sale or Lease
S/3
5415-D21
Full System
Available Immediately
data sales co.
12100 riverwood drive • burnsville, minnesota 55337
612•890•8838

FOR SALE
IBM 4331
1 MEG
Immediate Delivery
CALL:
JOE SMITH
BREMCO INDUSTRIES (614) 569-4182

SALE OR LEASE
4341-K
3880-1
AS MANY AS YOU NEED WHEN YOU NEED THEM
COMPUTER SALES, INC.
P.O. Box 56
Matawan, New Jersey 07747
(201) 583-6616

WANTED!
MOST ALL
NCR
ELECTRONIC EQUIPMENT

SMITH ANDERSON CORP.
68-757 SUMMIT DRIVE
CATHEDRAL CITY, CA. 92234
(714) 346-3227
(714) 324-4427

FOR SALE:
Burroughs Model B700
9.2 megabite disc drive and 160 line per minute printer to be sold as a complete unit or component parts.
Call David Caddell at (617) 458-1275.

buy sell swap | buy sell swap | buy sell swap | buy sell swap | buy sell swap

O.P.M. LEASING SERVICES, INC.

The Custom Leasing People

Branch Offices

ATLANTA	(404) 953-0926
BOSTON	(617) 749-4844
CHICAGO	(312) 945-8150
DALLAS	(214) 641-7870
DENVER	(303) 499-4488
DETROIT	(313) 996-5811
HOUSTON	(713) 367-1668
KANSAS CITY	(816) 474-8106
LOS ANGELES	(213) 278-4117
MINNEAPOLIS	(612) 884-9980
NEW JERSEY	(201) 635-1092
N.Y. FINANCIAL DISTRICT	(212) 747-0220
ST. LOUIS	(314) 434-6330
SAN FRANCISCO	(415) 383-4111
WASHINGTON, D.C.	(202) 656-8676

International Offices

LONDON	01-222-4031
PARIS	331-775-0511
COLOGNE, GERMANY	221-763-1458

Corporate Headquarters
O.P.M. LEASING SERVICES, INC.
71 BROADWAY, NEW YORK, N.Y. 10006
(212) 747-0220
TWX: 710-581-5223 OPM LEASE/NYK

Short and Long Term Lease Plans Available

CPUs

- 370/135, 370/145, 370/155, 370/165 — All Configurations Available For Sale or Lease
- 303X Series — Purchase/Leaseback of Installed or OPM Supplied
- 370/158, 370/168 — All Configurations Available For Sale or Lease
- 4300 Series — All Configurations Available for Sale or Lease "Subject to adherence to IBM's order certification process"
- 370/138, 370/148 — All Configurations Available For Sale or Lease
- Amdahl All Models, CDC Cyber 74, Univac 1100 Series — All Configurations Available For Sale or Lease

FEATURES/MEMORY

- 370/158 & 168 ISC/Madrids All Channels — For Sale or Lease
- IBM Memory: 370/158s, 168s, etc. or 3000 Series Machines — For Sale or Lease
- OEM Memory: 155s, 158s, 168s, either EM&M, NSC, Intel or STC — For Sale or Lease

PERIPHERALS

- 3333/3330s, 3350s, 3830s — All Configurations Available For Sale or Lease
- 3803 Controllers, 3420 Tapes — All Models and Configurations Available For Sale or Lease
- 3211/3811, 1403/2821 — All Configurations Available For Sale or Lease

Complete Installation and Planning Support Provided

FOR SALE
BURROUGHS
1724 System - available immediately
INCLUDES:
- 1724 Processor 128K
- 9245 Printer 300LPM
- 9115 Card Reader 300CPM
- 9499 Disc Pack Drive
- (3) PC820 Data Recorder

CONTACT
Jim Haworth
TEDDI OF CALIFORNIA
13889 So. Figueroa St.
Los Angeles, CA 90061
PHONE (213) 516-0531

3310
3370
Disk Drives
Immediate Delivery
call
Bob Bardagy
312•698•3000
Or Your Local Office
COMDISCO

WANTED
IBM EQUIPMENT PERIPHERALS
BUY. SELL. LEASE
Call or write:
JORDAN HALPER
HALPER MARKETING INC.
15 WEST 44th ST.
NEW YORK, N.Y. 10036
212/840-1175

URGENTLY NEEDED! CASH AVAILABLE.
DEC
11/34
SYSTEM
CALL (617) 261-2750

• DATA GENERAL •
• DEC •
SURPLUS SPECIALS

DATA GENERAL		DEC
NOVA 4/X, NOVA 3/D, NOVA 1200, NOVA 2/10, ECLIPSE S/230, ECLIPSE C/330	CPU'S	PDP 8, 11/03, 11/04, 11/05, 11/34A, 11/45
NOVA, ECLIPSE	MEMORY	MM8EJ MM8AB, MM11DP MS11JP, MS11LB MS11LD
6070-N 20 MEG SUBSYSTEM, 6045 10 MEG DRIVES, 6030 DUAL FLOPPIES, 6060-A 96 MEG	DISKS	RX8BA RK05, RX8E RL01, RP02 RP03, RP04 RP06, RM02 RM03
6026 800/1600 BPI, 6026-A SLAVE UNIT	MAGNETIC TAPES	TM8/11MA, TM8/11EA
4251 COMMUNICATIONS CHASSIS, 4264 SYNC. LINE MUX, 4250 DCU 50, 4256 ALM 4	COMMUNICATIONS	DZ11, DH11
6053 CRT'S, D-100, 6012 CRT'S, D-200	TERMINALS	VT52 LA180, VT100 LA36

BUYING OR SELLING, CALL:
•DEC - Bryan Eustace 305-272-2338
•DATA GENERAL - Phil Thomas 305-272-2339
Thomas Business Systems, Inc.

IBM PERIPHERALS
SALE OR LEASE
DASD: 3310, 3330, 3340, 3344, 3350, 3370
TAPE UNITS: 3410 ALL MODELS, 3420, 3203, 3211, 1403, 3287, 3289
PRINTERS: 3803, 3811, 3830, 3800, 2821, 3216, 3274, 3272, 3271
CONTROLLERS: 3505, 3525, 2540, 2501, 1442
CARD I/O: 3278, 3277
DISPLAY STATIONS
MICR: 1419 SINGLE/DUAL ADDRESS
MOST ITEMS AVAILABLE FOR IMMEDIATE DELIVERY
Contact: Bernie Gest
215-782-1010
Computer Marketing Inc.
7704 Seminole Avenue
Phila., Pa. 19126

buy sell swap | buy sell swap | buy sell swap | buy sell swap | buy sell swap

DEC 1-Day Ship

11/60

ALL PDP11/70/55/45/40/34/20/15/10/05/03

AMERICAN USED COMPUTER
P.O. BOX 68, KENMORE STATION, BOSTON, MASSACHUSETTS 02215
CALL (617)261-1100

SELLING

System-3 Series One
System-34 3270 Equipment
System-38 All Data Entry Equipment

Vantage
Computer Marketing, Inc.
2460 Southwell
Dallas, Texas 75229
214/620-8380
TWX 910-860-5060

BUY – SELL – LEASE – BROKERAGE
Let the
"NATIONS LARGEST WHOLESALE DEALER"
Buy, sell, lease, sub-lease, or be your agent in placement of your pre-owned IBM 360/370/System 3, or other units
COMPUTER INTERNATIONAL, LTD.
CWC's international division — experts in foreign markets, freight, customs
BEACH COMPUTER CORPORATION, CWC's Leasing Division
COMPUTER WHOLESALE CORP., (504) 581-7741
SUITE 507/508 FIRST NATIONAL BANK OF COMMERCE BLDG.
NEW ORLEANS, LOUISIANA 70112
MEMBER OF COMPUTER DEALERS ASSOCIATION

For Lease

370/148 Model J and Power Unit 3047

Features:
6111, 8075,
4660, 2152.

3 years - $2,500/month
2 years - $3,000/month
1 year - $4,000/month

Call Ken Cushman
515/274-3531

WE BUY/SELL/TRADE
All Models of

SYSTEMS
PERIPHERALS
TERMINALS
COMMUNICATIONS
CADD

Call for Information
DEC - DGC - HP
& Others
(800) 527-3723
(214) 252-7454

PINZONE & ASSOCIATES, INC.
3322 STOVALL STREET
IRVING, TEXAS 75061

STATE OF CONNECTICUT
REQUEST FOR PROPOSAL

Vendors interested in responding to a forthcoming RFP for Fiscal Agent to develop and operate a Title XIX Medicaid Management Information System for the State of Connecticut to contact:

Gordon L. Partridge, Director
State of Connecticut (DAS)
Office of Resources & Facilities
340 Capitol Avenue, 1st floor
Hartford, CT 06115
(203) 566-3304

Anticipated release of RFP: during October 1980

Reference: RFP #RF0024

Closing Date: Ten (10) days from date of this issue.

STATE OF CONNECTICUT
REQUEST FOR PROPOSAL
REFERENCE: RF0037

Vendors interested in receiving a copy of an RFP for OPTICAL CHARACTER RECOGNITION SYSTEM are asked to contact:

Gordon L. Partridge, Director
State of Connecticut (DAS)
Office of Resources & Facilities
340 Capitol Avenue, 1st floor
Hartford, CT 06115
(203) 566-3304

This acquisition will encompass nineteen (19) OCR readers and associated support-ive services located throughout the State.

REFERENCE: RF0037
CLOSING DATE: Ten (10) days from date of this issue.

BUY • SELL • LEASE

370/115
370/125
Call John Ferguson

370/135
370/138
Call Mike Nelson

370/145
370/148
Call Ken Bouldin

S/3
MODEL 8
MODEL 10
MODEL 12
Call Roger Odom

MODEL 15
Call Jack Goodman

3742
Call Gayle Drotar

S/34
Call Roger Odom
IBM Maintenance Guaranteed

TAPE
3411·3410
3420
DISK
3340·3344
3350
Call Bob Ford

ECONOCOM
1755 Lynnfield Road
P.O. Box 17825
Memphis, Tennessee 38117
901-767-9130
Member CDA

GMI
AMERICA'S LEADING SPECIALIST SERVING THE USED MARKET!

3276
Any Configuration
Available Nov. 1, 1980
Sale or Lease
Kay Richard

GMI CORPORATION
(313) 352-1000

3277 CRT's
& Associated Control Units
IMMEDIATE DELIVERY
Configured to your Specs
Lease or Purchase
Short Terms Avail.

4331-K Group 2
Oct. 24, 1980 SHIP

3138-J, IFA, ICA
Available Jan. 1981

Call Steve Dreyer or Judie Pye
Princeton Computer Associates Inc.
205 LIVINGSTON AVENUE
NEW BRUNSWICK N.J. 08901
(201) 846-2200

FOR SALE OR LEASE

4341/L Processor (Dec.)
3211/3811 Printer (Oct.)
3330/1 DASD (Dec.)
3340/B2 DASD (Now)

Please Call: (312) 943-3770
Forsythe/McArthur Associates, Inc.
919 North Michigan Avenue
Chicago, Illinois 60611

DATA GENERAL SPECIALISTS FOR
Surplus New & Used Equipment & Systems
with full depot repair facilities.
CALL US
WE TAKE THE TIME.
— WE CARE —
JM Associates
601 W. Chapel Avenue — Cherry Hill, NJ 08002
609-663-1115

WE HAVE
VT100's
MANUS SERVICES CORPORATION
Seattle **206-285-3260**
Portland **503-245-1261**

DECISION DATA PRINTERS
for any System 3 or System 34
Up to 1500 LPM
NORTHERN GROUP LTD., INC.
Shelard Plaza North
Suite 170
300 South County Road 18
Minneapolis, Minnesota 55426
(612) 546-0207

BUY/SELL/LEASE
Immediate Delivery
3274 1C
3276 — Model 2 & 12
3278 — Model 2
3287 — Model 1 & 2
3289 — Model 1 & 2
WANTED
3287-2
NEU-COMP. CO.
11 N. Arlington Heights Rd.
Arlington Heights, IL 60004
(312) 392-0720

4331-L2
4 MEG
SHIP:
OCT. 1980
212-273-6094

DEC DEC DEC DEC DEC DEC
BUY SELL TRADE
Digital Computer Exchange
P.O. Box 4044
Hayward, CA 94544
415/538-3270
Brokers - Dealers - Consultants of
DEC PDP-11
Computer Systems & Peripherals
DEC DEC DEC DEC DEC DEC

WE BUY
158 & 168
MEMORY
transdata
214/631-5647

For Sale
Liebert Challenger
5 Ton Air Cooled
Computer Room
Air Conditoner
3 Years Old
Very Good Condition
Available Around 11/1/80
Contact:
Howard P. Weiss
609-896-2404

TANDEM COMPUTER
Business liquidation makes available two processors 640 K memory, two 50 megabyte drives, tape drive, 300 LPM printer, misc. terminals & modems, presently operating & maintained. $69,000. takes it all. Call Owner at **(714) 556-9600**

FOR SALE OR LEASE
November 15, 1980
2880-2 with 1862
3151, 3152 Optional
CALL
Major Computer Incorporated
10237 Yellow Circle Drive
Minnetonka, Minnesota 55343
612/933-6000

buy sell swap | buy sell swap | buy sell swap | buy sell swap | buy sell swap

For Sale By Owner
IBM 370/135-384K
CPU, power unit and operator console.
IBM maintained.
Call no later than Oct. 9th.
V.J. Gorman
Brookdale Community College
765 Newman Springs Rd.
Lincroft, N.J. 07738
201/842-1900, ext. 271

WANT TO BUY
Wordstream
Terminal Equipment
G77 Display Stations
W/Data Entry Keyboards
G-120 Printers
Contact:
Diane Prestigomo
Leasing Dynamics, Inc.
1717 East Ninth St.
Cleveland, Ohio 44114
216/687-0100

Need an interim solution?
Try our PRICE PERFORMERS
Short and Long-Term Leases
138's PLUS 148's
RELATED I/O
Any Configuration
CLE COMPUTER LEASING SPECIALISTS
4480 North Shallowford Road / Atlanta, Georgia 30338 / (404) 394-9533

BUY & SELL
Tape Drives & Controllers
Used Only
For DEC Systems
DEC Equipment and Peripherals
Used Only
Highest Prices Paid
AAA Computer Service
3401 Market St.
Philadelphia, PA 19104
215/382-5587

PDP 11/40
with (4) RP02 drives
and (2) RK05 drives
112K words memory
DZ11E 16 line MUX
RSTS/E-7A datatrieve
V.02 BASIC +2
Available about Sept. 30, 1980
Call Bruce Gulleksen toll free
800/528-5567 with offer.
Phoenix, Arizona.

IBM SERIES 1
For Sale By Owner
Model 4952-B Processor, 64KB, 9.3 megabyte disk, 4974-1 Printer, (120CPS) Under continuous IBM maintenance.
$17,000.
404/633-0804

FOR SALE BURROUGHS B700
1 Model 702-85 Computer/ Console Entry System
2 9480 Disk Drives
1 9249 250 LPM Printer
27 Disk Paks
Call Ken Feasel @ (404) 321-3840

4341
DEC. 1980 Ship
Call 617-261-1100
AMERICAN COMPUTER GROUP, INC.
P.O.BOX 68, KENMORE STATION, BOSTON, MASSACHUSETTS 02215

PRIME 400
For Sale
300 megabyte disk
32 user communications
2 mag tapes, 800/1600 BPI
Hi-speed printer
256 KB of memory
Contact:
William Wilkins
Telic International
215/348-4088

DEC
VT100 – AA $1350
VT1XX – AB (Advance Video Option) 250
New • In Stock • Immediate Delivery
Quantity Discounts on 2 or more
Please Contact:
Ken Hansen
(414) 353-1070

For Sale
60 Used 5440 disk packs
Will accept reasonable offer
Call Joanne Campbell
Newaygo County Intermediate School District
1035 James St.
White Cloud, MI 49349
616/689-6601

IBM
SYS 32 SYS 34 AND 5110
CALL (617) 720-0370
NATIONAL DATA SYSTEMS

BUY • SELL • LEASE • TRADE
SYSTEM 3 15D
Available Immediately
Sale or Lease
SYSTEM 34 or 38
Purchase/Leaseback
Substantial Savings
Call for a Quote
(612) 548-0207
NORTHERN GROUP LTD., INC.
2124 IDS CENTER
MINNEAPOLIS, MN 55402
System 34's Urgently Needed

Buy • Sell • Lease
3 32 34 38
All IBM Peripherals
CALL COLLECT! 901/372-2622
COMPUTER BROKERS, INC.
2978 Shelby St. • Memphis, Tennessee 38134

IBM 360/30
For Sale or Lease
CPU with decimal arithmetic, floating point, interval timer, first and second selector channels and 1051 attachment with control unit, printer keyboard, 1100 LPM printer, print train, card read punch, I/O controller with 1100 LPM adapter and UCS adapter, 4 disk drives, disk controller and 3 tape drives. Under constant IBM maintenance contract.
Available December 1980.
Contact:
Financial Architects
885 Providence Hwy.
Dedham, MA 02026
617/326-4650

FOR SALE BURROUGHS
• 9.2 Megabyte disk cartridge drive, dual density
• 160 Lines per minute printer
• Used disk Cartridges
CONTACT OWNER:
STEVE STOKES
(801) 531-0222

WE BUY, SELL, AND INSTALL
NEW AND USED COMPUTER ROOM FLOORING
Raised Floor Installation, Inc.
19 Sebago St.
Clifton, N.J. 07013
(201) 778-2444 in New Jersey
(212) 594-4039 in New York
(415) 546-9466 in California

For Sale
BURROUGHS B-1870
196KB Memory
1100 LPM Printer
Memory Expansion Cabinet
Multi-line Controller
130 Million Byte Disk
1600 BPI Tape Drive
(2) TD831's
Eligible for Maintenance
Call Mike Hood
DSI, INCORPORATED
2480 W. Alameda Ave.
Denver, Colorado 80223
(303) 922-8331
Telex: 910-931-0483
Member Computer Dealers Association

FOR SALE BY OWNER
HP 3000 III
1Mb CPU
Cobol II
3 7925 Disk @ 120 Mb
1 1600 BPI 7970E MTU
1 600 LPM 2617
32 Asynch Ports
9 2645 CRT's - 8K@ (3 with Cart. Tape)
1 2621 P Console
Early Availability
Will Finance
To Qualified Buyer
Call Mr. Grandone
800-323-7253
312-969-6304
Vaughan-Jacklin Corp.

NEW
DEC VT100's
for sale by owner
3 standard 3 advanced video
available NOW
PRICE NEGOTIABLE
CALL
SHEILA M. COHEN
(312) 298-2140
x364

AVAILABLE IMMEDIATELY USED-DEC-USED
11/34A 256KB 2-RL01's
2-DL11's
LA36 CTS-500 V6C RSTS/E.
11/V03-L 2-RX02's VT-100
LA-120 RT-11 Version 3B
11/34A 256KB 2-RL01's
2-DL11's
LA-36 RT-11 V3B
CALL MELINDA at
713-960-0848

FOR SALE
HONEYWELL
9 track tapes
and
controller
URS Since 1969
Call: Harvey Noel
(617) 438-4300
66 Montvale Ave.
Stoneham, MA 02180

buy sell swap | buy sell swap | buy sell swap | software for sale | software for sale

TEXAS INSTRUMENTS 990 MODEL 8

192K Dual
1 - FD800 Diskette Drive
2 - DS50 Disk Drives
4 - 911 VDT Displays
1 - 810 Printer

IMMEDIATE AVAILABILITY

Computer Systems Dept.
P.O. Box 10754
Dallas, Texas 75207
214/630-6782

4341

- Systems Available For Lease
- 4th Quarter 1980 Deliveries

COMDISCO

CALL YOUR LOCAL OFFICE OR KAREN JOHNS

312-698-3000

For Sale
IBM 370/138/J

Qualifies for IBM maintenance
Available Dec. 1980

Contact PSI
3822 Summit
Kansas City, MO 64111
816/561-0141

SOFTWARE WANTED

IBM 158 APU
Available October
IBM 3880's
Available November

Contact: Jerry A. Boriey
(303) 988-0820

JBI ASSOCIATES, INC.
12573 West 3rd Place
Lakewood, CO 80228

Member of Computer Dealers Association

IBM 4341L

Available November 21

Call Jim Conole
HELIX LEASING INC.
9297 Golondrina Dr.
La Mesa, CA 92041
(714) 697-8328

$12,000,000 LEASE FINANCING

I will provide custom TAX-LEVERAGED leases ($500,000+ each) on your IBM 303X, 4300, Peripheral packages, or AMDAHL system before 12/31/80. Call me now to discuss your needs.

Joseph Batch, V.P. at:
IPS COMPUTER MARKETING CORP.
(201) 262-9500

AUSTRALIA

Needs software for the System 34 and System 38. Therefore a young enterprising organization is visiting the U.S. in November looking for suitable packages.

If you feel you have developed something with saleable qualities send a brief description (enough for us to assess its potential) immediately.

We are also looking for software houses through whom we could act to sell packages in the U.S.

If you are interested in either or both the above categories please write: "SOFTWARE WANTED"

Box #453
Australisian Computerworld
37-43 Alexander Street
Crows Nest. N.S.W. 2065 Australia.

DEC

DH11AD	DUP11DA
VT100	11/23AA
LA34	RH70
DUP11DA	MJ11BE
DL11E, WB	MS11LB
DD11CK, DK	DZ11A
RM03	DR11C
RK05J,F	MS11JP
RL01,02	H960CA
LA11PA	DM11DC
DB11A	DM11BB
MR11EA	BA11KE

Western Data Systems
213/375-0523
PO Box 7000-182
Redondo Beach, CA 90277

IBM

3270

PRINTERS, TERMINALS & CONTROLLERS

Please Call: (312) 943-3770

Forsythe/McArthur Associates, Inc.
919 North Michigan Avenue
Chicago, Illinois 60611

For Sale
DEC 11/34

CTS 500-Basic+2
Dual RM02's
System D536

Call Martin Kenny
312/236-4252

WANTED
IBM OR DEC SOFTWARE

We are a U.K. Computer Services Company with a $2 million turnover. We provide consultancy services & software.

If you have proven IBM or DEC software and are interested in the U.K. market please send details.

All inquiries will be treated as confidential.

Contact:
Paul Ingram, Managing Director
Systems Resources, Ltd.
Systems House, 27 Spon St.
Conventry, England.
U.K. Phone: 0203-26301

SELL HP 9825

Includes 9825 A with
ROMS 98210 String/Adv. Prog.
9872 A Plot/Gen'l
98211 A Matrix ROM 250
98224 A Systems ROM 250
98036 A Cable 600
9871 A Printer/with Form Feed
98032 A Cable 400

Call:
Tom Cazar
(801) 487-9439

---

3 YEAR LEASE ON ANY 303X

New or Used

Call Charlie Albright
Sha-Li Leasing Associates, Inc.
40 Wall Street
New York, New York
(212) 482-8640

Available for Sub-Lease at a very favorable lease rate.

DEC 2020 CPU

256K words memory
LA36 console terminal
16 asynchronous lines
Tops-20 operating system
2-RH-11 mass bus controllers

Contact H.C. Wood
617/354-7000

WANTED
Integrated Accounting Package for Multi-Company Corporation

Must have extensive facilities for real estate development job cost accounting plus A/R, A/P, and G/L.

Write Marina Software Systems
6733 So. Sepulveda Blvd., Ste. B
Los Angeles, CA 90045
Attn: Mike McKay

Computer-world's classifieds work.

[That's why you see so many of them.]

For Sale
370/138
1 meg
Includes
4457, 4655, 8075
Available Nov. 1, 1980
Contact Bill Stone
Hinsdale Sanitarium & Hospital
312/887-2880

DEC PDP11/34A (D358 System)
For Sale By Owner

256K	bytes memory
3	RK07 disk drives
1	LP05 line printer
1	Printronix printer (300 LPM)
4	VT-100 CRT's
1	VT-52 CRT

All equipment under DEC maintenance and less than 18 months old.
Call M. Sayer at (312) 644-5818.

MEMOREX
70 MB DRIVES
3643-A1
3640-B1

For sale or sublease
Priced well below market
Terms open

Contact:
DP Manager
714-540-4567

SOFTWARE FOR SALE

FOR SALE
IBM System/3
Model 15D26
5 MEG - 3340A2 -
1403 600 LPM
Contact:
Al Lebovtiz
Alta-Dena Certified Dairy
(213) 984-6401

FOR SALE OR LEASE - IMMEDIATELY AVAILABLE

2305-2
3835-2 with F8171
1288 with F5370
3274-1D with F6901, 7802, 7803
629-B22
2804-2 with F5321
2401-5 with F7160
2301
2820
2260-1

Contact Marvin Habor
(301) 986-0600
Federal Data Corporation
4801 North Park Avenue
Chevy Chase, Md. 20015

Available
1-23-81
4341 L

PLT Order No 3920 LU
Upgrade to M2 On Order
Offered at NO PREMIUM

Pacific Coast Computer
(415) 332-3431
Sausalito, CA 94925

FOR SALE
EFFICIENT LSI-11 SYSTEM

- LSI-11/03 With 28K
- Bootstrap and MLSI-SMU System Monitoring Unit
- PERTEC Top-Loading 10MB (5MB fixed/5MB removable)
- Model D3422-M012-NWU Drive
- 3 5MB Removable Disk Packs
- DILOG Disk Controller for PERTEC Disk
- 2 DLV-11's for RS232 Interface
- Room To Add Your Own Devices
- Cabinet Containing All Of The Above

Phone: (213) 506-8700 or (714) 291-1600 from 9:00AM to 9:00PM PST
Price: $4950 (System shipped upon receipt of payment)
Buyer pays shipping. California buyers please add 6% sales tax.

MAJOR BANK LOOKING FOR USED DATAPOINT 1500's

Must be guaranteed Datapoint Serviceable

Please phone
Bob McGregor
216/344-5367

For Sale
IBM 4331
and
Peripherals
Buy all or part
315/682-8222

TEXAS INSTRUMENTS DS990
APPLICATION SOFTWARE

RCW now offers a choice, **DX10** or **DX5**...

- ACCOUNTS PAYABLE
- ACCOUNTS RECEIVABLE
- GENERAL LEDGER
- PAYROLL
- JOB COST
- LEGAL ACCOUNTING
- HYDRAULIC DESIGN
- PERSONNEL REPORTING
- JOBBER ACCOUNTING
- CUSTOM APPLICATIONS

Versatile, tutorial, comprehensive applications written in **COBOL** with user and system documentation are offered by

RCW COMPUTING, INC.
3107 PICO BLVD., SUITE C, SANTA MONICA, CA 90405 • (213)829-4202

software for sale | software for sale | software for sale | software for sale | software for sale

Two distinguished products for PDP-11 and VAX users

INTAC™ Interactive Data Base Management

INTAC is a new concept for data storage and retrieval that features an easy-to-use question and answer format, built-in edit rules, multi-key ISAM data access, interactive inquiry, and a unique report generator.

MAPS™ Financial Modeling

MAPS, recognized worldwide for over five years as a leader in financial modeling and reporting, is used to construct budgets, financial forecasts, consolidations and "what if" analyses.

Call us at (415) 856-1100

ross systems incorporated

1900 Embarcadero Road • Suite 208 • Palo Alto, California 94303

Make The Right Move

Check Dataware for an economical answer to your tough conversion problem. Here's one winning move:

(any) COBOL to (any) COBOL

One of the many **successful** Translators offered by Dataware is our COBOL-Converter a table-driven conversion system designed to convert COBOL programs from one version or level of COBOL to another. For more information please call or write today!

The Conversion Software People

Dataware, Inc.

2565 Elmwood Ave., Buffalo, NY 14217 (716) 876-8722 | TELEX 91519

NEW FOR SYSTEM/34

GENERATE ON-LINE F/M PROGRAMS – ON-LINE ADD/CHG/DEL/INQ
58 FIELDS, REPORT OUTPUT

S/34 DOCUMENTATION AND ANALYSIS AID SYSTEM

OTHER SYSTEMS FOR S/3 AND S/34 – A/P, G/L, A/R, P/R, OTHER

(EXTENSIVE DOCUMENTATION, RPG II SOURCE PROVIDED)

BANCROFT COMPUTER SYSTEMS, INC. (318) 388-2236
P. O. Box 1533 West Monroe, Louisiana 71291

- RPG/RPG II to COBOL
- COBOL to COBOL
- FORTRAN to FORTRAN
- NEAT/3 to COBOL
- DIBOL to COBOL

Converting is easy with

DASD

- Proven software
- Experienced personnel
- Nationwide offices

CHECK WITH US TODAY

DASD Corporation
Corporate Services Center
Dept. 130/9045 North Deerwood Dr.
Milwaukee, WI 53223
(414) 355-3405

GAP & UTIL

Help Fill The Gap Between The SYS-3 15 And The SYS 38 NCW

General Automatic Programs
A New Kind Of Query For The Sys-3 15
- Single Data Base Dictionary
- Security At Field Level
- Generates RPGII Source, Proc S.
- Compiles, And Executes Query
- On/Offline Dictionary Maint.
- Online Dictionary Display

Useful Terminal Input Language
Data Entry For 3277's
- Create Individual Layouts
- Guidance For Keying
- Save Layouts For Recall
- Layout Security
- Doesn't Take Object Space For Layout
- SAVE**
- Reduce The Number of 3741/3742's
- Reduce Programming Time For One Time Reports
- Involve Non-DP Dept. For Better Turnaround
- No Need To Add DFF Screens For Keying

Only 100 Copies Will Be Issued in 1980
$650 Both $400 Ea.

Kenneth M. Roe
PO Box 252
Rochester, IN 46975

HIGH-QUALITY ACCOUNTING AND FINANCIAL REPORTING SOFTWARE

For Dec (RT-11, RSX-11M) and Prime Mini-Computers

- General Ledger & Financial Reporting
- Payroll
- Professional Time & Billing
- Accounts Payable
- Accounts Receivable

BPS COMPUTING

3550 N. Lexington/St. Paul, MN 55112
call toll free 1-800-328-9574
In MN call collect 612-484-8800

NEW LIFE FOR 1401 PROGRAMS

CS-TRAN converts your 1401 *object* programs to COBOL for the mainframe or mini of your choice.

CS-TRAN is the *only* translator that accepts your object programs, patches and all, yet allows you to include actual COBOL paragraph names and record definitions.

If you'd like more details about new life for your 1401 programs just call or write Russ Sandberg.

C-S Computer Systems Inc.
90 John Street, New York, NY 10038
212-349-3535

DISTRIBUTORS WANTED
MEDICAL BILLING-MANAGEMENT

PSI-MED CORPORATION

SERIES/1 USERS

DSI now has available for immediate on sight installation a key-disk software package available on your EDX operating system, utilizing IBM 3101's and/or 4978's.

Custom installation and/or conversion from CMC/PERTEC* ENTREX/NIXDORF* FOUR PHASE* CADE* INFOREX* is now available.

Datronic Systems Inc.
940 Springcreek Pkwy.
Plano, TX 75023
214/596-2774

OMNIDATA

INTERACTIVE data management package for DEC (RT-11) and BASIC/4 systems.

BERMAN ASSOCIATES
Suite 14, 101 East Holly Ave.
Sterling, VA 22170
(703) 450-5000

BUY & SELL

Software for DEC 11/34
Any type, any language.

Financial Software in COBOL for any system

AAA Computer Service
3401 Market St.
Philadelphia, PA 19104
215/382-5587

5120 SOFTWARE DEALERS

Profitable dealerships available in Conn., Dela., Maryland, Mass., New York, Penna., R.I. Mature, field-tested software: Invty, Payroll, A/R, A/P, G/L & industry specials. Experienced, responsible dealers invited. IBM 5120 S.E. or MKTG experience a plus.

Call Jim Kirk At:
Alpha Applied Systems, Inc.
(201) 239-2167

MSA

The Right Choice.

Choose the MSA software application to meet your needs.

Cash Management	Accounts Payable/ Accounts Receivable
	Procurement Matching/ Supplies Inventory
	Control and Purchasing
Financial Reporting	General Ledger/ Financial Information and Control
	Financial Forecasting and Modeling
	Fixed Assets Accounting
Human Resources	Payroll Accounting
	Personnel Management and Reporting

MSA's 1600 software professionals serve clients at over 4700 sites worldwide. And with offices located in major cities throughout the world, MSA and its staff of highly trained installation and training experts are always as close as a phone call.

All MSA software is written in ANS COBOL and is backed by documentation, installation, training and ongoing support.

For more information on MSA systems, contact Robert Carpenter at Management Science America, Inc., 3445 Peachtree Road, N.E., Atlanta, Georgia 30326, or call (404) 262-2376.

SYSTEM 34 WORD PROCESSING

Paratext $250

Full Service Text Editor	Memos
Enter, Edit, Store Text	Contracts
Automatic Centering	Documentation
Automatic Justification	Sales Brochures
3 Print Programs	Business Letters
Individual Forms Design	Marketing Campaigns

For documentation, call Jeffrey Papows (617) 546-3413

Para Research, Rockport, MA 01966

TIME & SERVICES

FAST DEPENDABLE BOARD REPAIR

Data General	**Interdata**
DEC	**Computer Auto**
Data Products	**Diablo/CDC**

- 7 DAY TURN-AROUND
- "RACE" (24 hour) SERVICE
- 60 DAY FULL BOARD WARRANTY

MMI MINI-MAINTENANCE, INC.

3020 LINCOLN CT., GARLAND, (DALLAS) TEXAS 75041
1-800-527-4841 TWX 910 860-5089
CONTACT: CHUCK MITCHELL

TO ALL MANUFACTORS AND INVENTORS OF

computers, wordprocessors, supplies and all other interesting "new products" for the European and Arabian market.

We are an European marketing organization.

As we are expanding our existing product line, we are in the market for new products.

Our business trip through the U.S. will be in October this year.

We like to meet American factories and/or inventors of intelligent products for the European and Arabian market.

Please send your product and/or business information to the number of this newspaper.

Because of our marketing strategie and market position, we are not able to print our name in this advertisement.

However, you can rely upon, that all reactions will be solved in strict confidence.

CW Box 2392
378 Cochituate Rd., Rte. 30
Framingham, Mass. 01701

TIMESHARING

PDP 11/70 RSTS/E
Hourly charge or flat rate per month, plus storage
BASIC PLUS 2, RMS-11K AND RPG II

STAR PLAN DATA PROCESSING
2040 W. Wisconsin Avenue
Milwaukee, Wisconsin 53233
414/933-0800

I.B.M. 360-40

All Shifts, 128K, 4-2401 MOD-2, 9-2314, 1403-N1, 2540, 1401 Compatibility.

From $35/Hour

Restaurant Associates, Inc.
1540 Broadway
New York, N.Y. 10036
Contact:
Al Palmo (212) 997-1413
Charles Leigey (212) 997-1411

time & services | time & services | time & services

MEMORY & COMPUTER REPAIRS

ANY MANUFACTURER'S MEMORIES
CORE — SEMI
DEC® — DATA GENERAL
COMPLETE CPU'S AND MEMORIES

THREE DELTA CORP
1038 Kiel Court, Sunnyvale, CA 94086
(408) 734-2680
TWX-910 339-9511

FOR DEC PDP-10 or PDP-11 MULTI-VENDOR HARDWARE USERS

TYMSHARE

Hardware Support

- No-hassle single source service on your multi-vendor systems
- Quick response time with maintenance personnel available 7 days, 24 hours
- Fast efficient repairs based on ready access to needed parts
- Complete staging and systems integration of multi-vendor hardware
- System installation at your facilities
- Depot level repair and refurbishment services available if needed
- Experience based on providing professional maintenance service to over 300 mainframes nationally
- Savings in dollars, downtime and your time

For more information contact the Tymshare Equipment Support Division regional office nearest you.

10231 Bubb Road
Cupertino, CA 95014
PH: 408/446-6672

1513 Del Amo Blvd.
Carson, CA 90746
PH: 213/638-0574

10111 George Palmer Highway
Bowie, MD 20716
PH: 301/459-8363

TYMSHARE®
EQUIPMENT SUPPORT DIVISION

COMPUTER REPAIRS

NOVA 1200, 2, 3
ALL BOARDS
CPU-MEMORY – I/O ETC.

MEMORIES AND POWER SUPPLIES
ANY MANUFACTURER

90 Day Warranty – 10 Day Turnaround

DIGITAL DATA SYSTEMS, Inc.
1226 N.W. 65 Terr., Plantation, FL 33313
Florida (305) 792 3290
Boston (617) 491 3859
Chicago (312) 475 4435
Philadelphia (215) 272 7442
OUR 8TH YEAR OF SERVICE

Thomas National, Inc.

XEROX 9700 Laser Printing Service

- 8½ x 11 Paper in Portrait or Landscape Mode
- Custom Designed Forms
- More than 200 Fonts available
- Cost savings in mailing, storage and handling
- Competitive prices.

For information, prices or free demonstration call (212) 785-9500

Thomas National, Inc
1700 Broadway, New York
NY 10019

370/168 mod 3 Datacenter
4.5 meg MVS
Specializing in
Remote Job Entry
TSO, CICS, and Batch
IBM 3800 Laser Printer
Very Attractive Rates
Contact: Stu Kerievsky
(212) 564-3030
Datamor
132 West 31 St.
New York, N.Y. 10001

COMPUTER TIME
370-148J
DOS-VSE/RJE/CICS/VOLLIE
Excellent Availability All Shifts
Remote Processing or "HANDS ON"
For Top Priority Scheduling Call DOUG GREENE at:
(212) 889-3386
ICS
One Park Avenue
New York, N.Y. 10016

TIMESHARING
SAVE 50% AND MORE ON CMS, TSO, ETC
As computer time brokers, we offer reliable timesharing services at rates far below those of national Timesharing firms.
Computer Reserves, Inc.
(212) 599-0770
(201) 676-1881

BROKERS OF COMPUTER TIME
On-site time: N.Y. metro area only
Timesharing & RJE: Nationwide
Computer Reserves, Inc.
(212) 599-0770
(201) 676-1881

Curtis Wright Computer Services
370/158-3
VS1 - CMS - DOS
REMOTE JOB ENTRY
INTERACTIVE COMPUTING
TURNKEY SYSTEMS
PACKAGED PROGRAMS
(201) 777-3454
15 Minutes from Lincoln Tunnel
One Passaic Street
Wood-Ridge, N.J. 07075

TIME BROKERS INC.
SELLERS OF COMPUTER TIME
(212) 921-8855
NY • NJ • PA • CT
tbi SINCE 1964

PDP 11 RSTS/E
TIMESHARING
- Serving L.A. and Orange County
- $6 per Hour
- Terminal Leasing Available
- Basic-Plus 2, RMS-11 K, FORTRAN IV

Contact: Al Nelms
(714) 994-3241
COMMAND COMPUTER SERVICE, INC.
14402 Industry Circle
La Mirada, CA 90638

Computer Time Brokers & Specialists
- On-site or remote processing
- Serving the Tri-State Area

BROOKE COMPUTER CORP.
250 W. 57 ST., NEW YORK, NY 10019
212/586-0923

COMPUTERWORLD

ADVERTISERS' INDEX

Alanthus 37
American Key Data 41
American Peripheral Exchange 62
Ann Arbor Terminals ID/31
Applied Data Research 83
Applied Digital Data Systems 57
Applied Software 66
Avanti Communications 33

BASF Computer Systems 68
BDS Computer Corp. 93
John Beall 79
Beehive International ID/6
Boole & Babbage 67
Brian Productn 23
BTI 42

Carterphone 71
Cass Marketing 40
Cerritos Computer Services 29
Chicorp Services, Inc. 20
Comdisco 56
Comp Ed 8
Computer Concepts, Inc. 89
Computer Management Research 20
Computer Sciences Corp. 87
Computerworld 92
Conditioned Power 52, 94
Control Data 80
Cullinane Corp. 11
Curtis 1000 69
CW Conference Management Group ID/32
CW International 86
Cyborg Systems, Inc. 26

Data Access Systems 46
Data Processing Design 82
Datoram 78
Data South Computers, Inc. 16
Data Systems for Industry ID/31
Data Systems Services 86
Decision Data Corp. ID/2-ID/3
Digital Communications 73
Digital Equipment Corp./Educational Computer Systems 28-29
Digital Equipment Corp./Traditional Products 31, 90, 98
Digital Pathways 22
Dorlen Products ID/14

Eastman Kodak 83
EDP Security 82
Execucom Systems Corp. 63

Fairleigh Dickinson University 16
Fike Metal Products 82
Finar Systems 64
Formation 78
Four Phase Systems ID/12-ID/13

General Terminal Corp. 88, 91
Geac Systems Corp. 60

Hamilton Rentals ID/30
Hewlett-Packard 89
Hughes Aircraft 77

I.B.M./General Service Division 88, 80-81
ICCP 44
Info Builders ID/14
Infodata ID/26
Informatics 14, 96
Innovation Data Processing 7
Innovative Electronics 20
Input 38
Insac Software, Inc. 5, 17
Intel Corp. ID/4-ID/5
International Data Sciences ID/25
IPS Computer Marketing Corp. 14

KW Controls 70

Lee Data Corp. 94

3M Company 37
Magnuson Systems ID/16-ID/17
MFE Corporation 8
Microform 36
Misco 84
Mohawk Data Sciences 47
Morrow Designs 40-41
MTI, Inc. 70
Multi-Tech Systems 43
Mike Murach & Associates 9

National Advanced Systems 33
National Computer Comm. 39
NCR ID/19
Nixdorf 30-31
Nixdorf Computer Software Co. ID/21

Oberland 6
Ohio Scientific 43
On Line Software 64, 66
Optimum Systems 62

Pacific Mountain States Corp. 20
Panasonic 44
Peripherics ID/8
Phone 1 87
Policy Management Systems ID/24
Printer Systems, Inc. 76

Qume ID/30
Qwikterm 18, 32, 76, 98

Racal Milgo 34-35
Racal-Vadic 74
Ramtek Corp. 27
Raytheon Data Systems Co. ID/7
Rotan Mosle 24
Royal Business Machines ID/20

SCS International 66
Signal Technology 18
Software AG 23
Software International 10, 66
Southern Systems 136
Sperry Univac 61
SPSS, Inc. 32
SRI 65
Superior Electric 45

Tandem Computers ID/28-ID/29
Teleray 90
Televideo, Inc. 15
Telex Corp. 97
Terminal Systems 84
Texas Instruments Inc. ID/22-ID/23
TLC 84
Tomark ID/9
Tone Software Corp. 30
Total Technical Services 62

United Parcel Service 51
Unitronix Corp. 74

Vardon and Associates 32
Verhoef Information Packages 27
Visual Technology 84

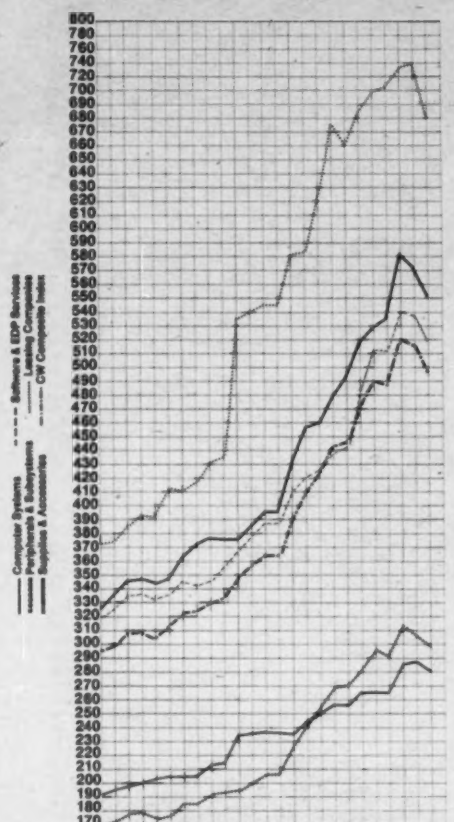
Wang Labs ID/11
Whitlow Computer Systems 3
Wordplus 94

Yourdon 19, 95

Zenith Data Systems 72

This index is provided as an additional service. The publisher does not assume any liability for errors or omissions.

Computerworld Stock Trading Index



COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

CW COMMUNICATIONS/INC.
Board Chairman/Publisher
Patrick J. McGovern
President
W. Walter Boyd

VP-Research Jack Edmonston
VP-Marketing Roy Einreinhofer
VP-Editorial E. Drake Lundell, Jr.
VP-Finance William P. Murphy
VP-Circulation Margaret Phelan
VP-Production Lee Vidmer

Computerworld Headquarters
375 Cochituate Road
Framingham, Mass. 01701
Phone: (617) 879-0700
Telex: 95-1153

SALES
Vice President Roy Einreinhofer
Display Adv Mgr Frank Collins
Display Adv Melinda Walker
Jonna Yager
Jenny Charlesworth
Classified Adv Mgr William J. Mills

MARKETING SERVICES
Vice President Jack Edmonston
Director Research Kathryn Dinneen
Sales Promotion Peter Segal

CIRCULATION
Vice-President Margaret Phelan
Circulation Mgr Barbara Jeannetti
Service Rep Peggy Kelly
Assistant Carmela Priante

PRODUCTION
Vice-President Lee Vidmer
Production Mgr Peter Holm
Supervisor Henry Fling
Typesetting Mgr Tom Pfau

Computerworld Sales Offices

Roy Einreinhofer
Vice-President/Marketing
Frank Collins
Manager, Display Advertising
William J. Mills
Manager, Classified Advertising
Diana La Muraglia
Manager, International Marketing Services
COMPUTERWORLD
375 Cochituate Road
Framingham, Mass. 01701
Phone: (617) 879-0700
Telex: 95-1153

BOSTON
Robert L. Ziegel
Northern Regional Director
Chris Lee
Edward P. Mareckl
District Managers
Kathy Doyle
Susan Wolfle
Account Coordinators
COMPUTERWORLD
375 Cochituate Road
Framingham, Mass. 01701
Phone: (617) 879-0700
Telex: 95-1153

NEW YORK
Donald E. Fagan
Eastern Regional Director
Peter Senft
Michael J. Masters
District Managers
Candy Kelly
Account Executive
COMPUTERWORLD
Paramus Plaza I
140 Route 17 North
Paramus, N.J. 07652
Phone: (201) 967-1350

CHICAGO
Dave Dolber
District Manager
Jane Wrightman
Account Coordinator
COMPUTERWORLD
2600 South River Road
Suite 304
Des Plaines, Ill. 60018
(312) 827-4433

LOS ANGELES
Jim Richardson
District Manager
Bob Hubbard
Account Manager
Kathie Knox
Account Coordinator
COMPUTERWORLD
3420 Ocean Park Boulevard
Suite 3020
Santa Monica, Calif. 90405
Phone: (213) 450-7181

SAN FRANCISCO
William J. Healey
Western Regional Director
Barry G. Milione
Bob Stetson
Account Managers
Ruth Gordon
Account Coordinator
COMPUTERWORLD
353 Sacramento Street
Suite 600
San Francisco, Calif. 94111
Phone: (415) 421-7330

JAPAN
Mr. Shigema Takahashi
General Manager
DEMPA/COMPUTERWORLD
1-11-15 Higashi Gotanda
Shinagawa-ku, Tokyo 141
Phone: (03) 445-6101
Telex: J2424461

UNITED KINGDOM
Steve Burton
IDG PUBLISHING LTD.
146 Clerkenwell Road
London EC1
Phone: (01) 837-1222
Telex: UK-269477

Euan C. Rose
BEERE, HOBSON ASSOCIATES
34 Warwickshire Kenilworth
Warwickshire, CV8 1HE
Phone: (0926) 57619
Telex: UK-311951

WEST GERMANY
Eckhard Utpadel
CW PUBLIKATIONEN
Friedrichstrasse 31
8000 Munich 40
Phone: (089) 34-90-61
Telex: W.Ger-5-215250-HKFD

AUSTRALIA
Alan Power
COMPUTERWORLD PTY. LTD.
37-43 Alexander Street
Crows Nest, NSW 2065
Phone: (02) 439-5133
Telex: SECCO AA25468

BRAZIL
Eric Hippeau
COMPUTERWORLD do BRAZIL
Servicos e Publicacoes Ltda.
Rua Alcindo Guanabara
25/10th floor
20031 Rio de Janeiro, RJ
Phone: (021) 240-8225
Telex: 11-32017 (WORD BR)

MEXICO
Kevin Kelleghan
COMPUTERWORLD de MEXICO
Oaxaca 21-2
Colonia Roma
Mexico City 7 D.F.
Phone: (905) 514-4218
(905) 514-6309

TRADE*QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, OCTOBER 1, 1980

All statistics compiled, computed and formatted by TRADE QUOTES, INC. Cambridge, Mass. 02139

F X C M		1979-80 RANGE (1)	PRICE CLOSE OCT 1 1980	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
A	AMDAHL CORP	15- 42	31	+ 1/2	+1.6
N	BURROUGHS CORP	60- 88	67 7/8	-2	-2.9
O	COMPUTER AUTOMATION	9- 27	22 1/4	- 1/4	-1.1
N	CONTROL DATA CORP	55- 76	69	-5	-6.7
O	CRAY RESEARCH INC	50- 91	82	+3 1/2	+4.0
N	DATA GENERAL CORP	46- 87	73 3/8	-2 3/4	-3.6
N	DATAPOINT CORP	44- 88	86 3/4	+1 1/4	+1.4
N	DIGITAL EQUIPMENT	52- 95	90 3/4	-4	-4.2
A	FECO INC	9- 20	18 1/2	0	0.0
N	ELECTRONIC ASSOC.	6- 12	10	- 3/4	-6.9
N	FOUR-PHASE SYSTEMS	20- 49	28 1/2	+1 7/8	+6.1
N	FOXBORO	31- 55	49 3/8	+3 1/2	+6.6
O	GENERAL AUTOMATION	7- 19	8 5/8	- 3/8	-4.1
O	GRI COMPUTER CORP	1- 3	7/8	- 1/4	-22.2
N	HEWLETT-PACKARD CO	46- 74	76	-2 1/8	-2.7
N	HONEYWELL INC	65-101	88	-7	-7.3
N	IBM	90- 79	65 5/8	+1 7/8	+2.7
N	MAGNUSON COMP SYSTS	20- 36	31 3/4	-2 1/2	-7.3
N	MANAGEMENT ASSIST	9- 24	19 1/2	- 1/2	-2.5
O	MANUFACTURING DATA S	22- 59	48 3/4	+ 5/8	+1.0
O	MINI-COMPUTER SYST	2- 6	3 3/8	+ 1/8	+3.8
O	MODULAR COMPUTER SYS	9- 30	26 3/4	-1 1/4	-4.4
N	NCR	52- 82	66 1/4	-5 7/8	-8.1
N	PRIME COMPUTER INC	15- 49	41 1/4	-3	-6.7
N	PERKIN-ELMER	26- 60	58 3/8	+2 1/2	+4.4
N	SPERRY RAND	42- 60	50 1/8	-2 3/4	-5.2
A	SYSTEMS ENG. LABS	11- 45	42 1/8	- 3/4	-1.7
O	TANDEM COMPUTERS INC	13- 96	54 1/2	+1 3/4	+3.3
N	TEXAS INSTRUMENTS	74-144	131 1/2	-7	-5.0
A	WANG LABS.	17- 60	53 1/2	-2 1/2	-4.4
	LEASING COMPANIES				
O	BOOTHE FINANCIAL CP	13- 23	20 1/2	-1 3/4	-7.8
N	COMPISCO INC	6- 18	15 1/2	- 1/2	-3.1
A	COMPUTER GROUP CORP	1- 2	1 1/8	+1	+47.0
A	COMPUTER INVSTRS GRP	2- 4	2 1/8	- 1/4	-10.5
O	CONTINENTAL INFO SYS	2- 15	5	- 1/2	-9.0
M	DATRONIC RENTAL	2- 4	3 3/8	- 1/4	-6.8
A	DCL INC	3- 6	3	- 1/4	-7.6
N	DPF INC	4- 12	7 7/8	0	0.0
N	ITEL	1- 19	2	- 1/8	-5.8
O	LEASPAC CORP	1- 2	5/8	0	0.0
A	PIONEER TEX CORP	2- 4	2 7/8	0	0.0
N	RELIANCE GROUP INC	24- 79	76 7/8	-1 1/2	-1.9
N	U.S. LEASING	12- 23	21	-1 1/4	-5.6
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 6		+ 1/2	+11.1
O	ANACOMP INC	7- 20	17 1/4	- 7/8	-4.8
O	ANALYSTS INTL CORP	1- 8	7 1/2	+ 1/2	+7.1
A	APPLIED DAT RES.	8- 21	19	+ 5/8	+3.1
N	AUTOMATIC DATA PROC	31- 52	47 1/4	+4 3/8	+8.4
O	COMPUTER HORIZONS	1- 9	3 3/4	- 1/4	-6.2
O	COMPUTER NETWORK	4- 9	6 5/8	- 1/4	-3.6
N	COMPUTER SCIENCES	11- 30	27 3/4	- 3/8	-1.3
O	COMPUTER TASK GROUP	1- 20	17	0	0.0
O	COMPUTER USAGE	2- 10	7 1/4	-1	-12.1
O	COMPUT AUTO REP SVC	4- 10	8 7/8	- 5/8	-6.5
O	COMSHARE	11- 21	18	- 1/4	-1.3
O	CULLINANE CORP	18- 61	52 3/4	0	0.0
O	DATA DIMENSIONS INC	1- 6	1 7/8	- 1/8	-6.2
O	DATATAB	1- 4	1	0	0.0
O	DST CORP	4- 9	7	- 1/2	-6.6
N	ELECTRONIC DATA SYST	19- 37	32 1/2	+2 1/2	+7.1
O	INFORMATICS INC	9- 24	20	+1 5/8	+6.4
O	INSYTE CORP	1- 3	2 1/8	0	0.0
O	IPS COMPUTER MARKET.	2- 4	3	0	0.0
O	KEANE ASSOCIATES	3- 9	5 1/2	- 3/4	-12.0
O	KEYDATA CORP	2- 5	2 1/4	0	0.0
A	LOGICON	12- 27	23 5/8	-2 1/2	-9.6
O	MATHEMATICA INC	9- 18	15	-2	-11.7
C	NATIONAL DATA CORP	10- 25	23 3/4	- 1/8	-0.5
N	PLANNING RESEARCH	4- 10	9 3/4	+1 1/8	+13.0
O	PROGRAMMING & SYS	1- 1	3/4	0	0.0
O	RAPIDATA INC	4- 9	7 7/8	- 7/8	-10.0
O	REYNOLDS & REYNOLD	21- 34	23 1/2	-1 1/2	-6.0
O	SYSC INC	6- 17	15 1/2	+1	+6.9
O	SCIENTIFIC COMPUTERS	6- 27	23	-2	-8.0
N	TYMSHARE INC	34- 71	65	+4 3/4	+6.8
A	URS SYSTEMS	5- 19	13 3/4	0	0.0
N	WYLY CORP	6- 18	16 1/4	- 3/8	-2.2
	PERIPHERALS & SUBSYSTEMS				
N	AM INTERNATIONAL	13- 24	15 1/4	-1 1/2	-8.9
N	AMPEX CORP	16- 29	25 3/4	-1 1/8	-4.1
A	ANDERSON JACOBSON	9- 18	15 1/2	-1 3/4	-10.1
N	APPLIED DIG DATA SYS	9- 12	11 3/4	+ 1/4	+2.1
O	AUTO-TROL TECHNOLOGY	18- 62	54 1/2	+1 1/2	+2.8
O	MEMOREX INTL	9- 17	16 1/2	-1 1/4	-7.0
A	ROLT-BRANEK & NEW	12- 33	28	-5	-15.1
N	RUNNER-RAND	17- 41	37 1/2	-1 1/2	-3.8
O	CAMBRIDGE MEMORIES	1- 9	3 1/2	- 1/8	-3.4
N	CENTRONICS DATA COMP	20- 45	30	-2 7/8	-8.7
A	CETEC CORP	3- 7	6 1/2	- 1/8	-1.8
O	COMPUTER DEVICES INC	4- 10	8	- 1/4	-3.0
O	COGNITRONICS	1- 7	5 5/8	- 3/8	-6.2
O	COMPUTER COMMUN.	4- 10	6 5/8	- 1/4	-3.6
O	COMPUTER CONSOLES	4- 29	22 3/4	+1 3/4	+8.3
O	COMPUTER TRANSCEIVER	1- 5	3	0	0.0
N	COMPUTERVISION CORP	24- 92	57 3/4	-2 5/8	-4.3
N	CONRAC CORP	13- 25	18 3/8	-1 1/2	-7.5
	DATA ACCESS SYSTEMS	6- 17	14 1/4	- 7/8	-5.7
A	DATA PRODUCTS CORP	11- 33	29 5/8	-2	-6.3
O	DATUM INC	2- 4	3 7/8	0	0.0
O	DECISION DATA COMPUT	2- 6	4 7/8	- 1/4	-4.8
O	DELTA DATA SYSTEMS	1- 3	2 3/8	- 1/8	-5.0
N	DOCUMATION INC	7- 27	17	- 1/4	-1.4
O	DATARAM CORP	6- 37	10 5/8	- 1/2	-4.4
N	ELECTRONIC M & M	3- 8	7	- 1/4	-3.4
O	EVANS & SUTHERLAND	21- 72	68 1/2	- 1/2	-0.7
O	FABRITEK	1- 4	3 5/8	+ 1/8	+3.8
O	GENERAL COMPUTER SYS	1- 4	1 1/4	- 1/8	-10.6
O	GENERAL DATACOMM IND	12- 27	24	-2 3/4	-10.2
O	GENERAL TERMINAL CP	1- 4	2	0	0.0
N	HAZELTINE CORP	12- 31	27 3/8	-2 1/4	-7.5
N	HARRIS CORP	29- 46	43 1/2	- 5/8	-1.4
O	INFOREX INC	1- 8	1	0	0.0
O	INFORMATION INTL INC	8- 15	13 1/4	+ 1/2	+3.9
O	INTEL CORP	45- 95	90	+ 3/4	+0.8
O	INTERSIL	19- 33	32 3/8	- 1/8	-0.3
A	LUNDY ELECTRONICS	4- 12	10 3/4	0	0.0
O	MSI DATA CORP	9- 16	14	- 1/8	-0.8
N	MEMOREX	10- 34	14 1/8	- 3/8	-2.5
N	MOHAWK DATA SCI	10- 26	27	+1 1/4	+4.8
O	OMEX	2- 10	9 1/2	0	0.0
A	PARACYNE CORP	18- 50	46 7/8	+1 1/4	+2.7
A	PENRIL CORP	9- 15	11 1/2	-1	-8.0
O	RAMTEK CORP	10- 17	15 1/2	- 3/4	-4.6
O	RECOGNITION EQUIP	9- 18	15 3/8	-1	-6.1
O	SCAN DATA	2- 5	2 1/2	- 1/8	-4.8
N	STORAGE TECHNOLOGY	12- 23	21 1/4	-1 1/8	-5.0
O	SYKES DATATRONICS	14- 44	44 1/4	+6 1/2	+17.2
O	T BAR INC	14- 21	19 3/4	+ 3/4	+3.9
A	TEC INC	3- 9	6	- 5/8	-9.4
N	TEKTRONIX INC	42- 70	64 1/4	-1 3/8	-2.0
N	TELEX	3- 6	5 1/4	- 1/8	-2.4
O	TESDATA SYSTEMS CP	8- 26	12 1/2	- 7/8	-6.5
A	TIMEPLEX INC	7- 29	24 3/4	-1 3/4	-6.6
O	WILTEK INC	1- 3	2 1/2	- 1/8	-4.7
	SUPPLIES & ACCESSORIES				
A	AMERICAN BUS PRODS	8- 15	13 1/2	-1 1/8	-7.6
O	BALTIMORE BUS FORMS	1- 2	3/4	0	0.0
N	BARRY WRIGHT	15- 46	40 1/4	-2 1/2	-5.8
O	CYPERMATICS INC	1- 1	1 1/8	+ 1/8	+12.5
A	DUPLEX PRODUCTS INC	11- 16	14 3/4	- 1/4	-1.6
N	ENNIS BUS. FORMS	13- 21	19 3/8	- 7/8	-4.3
N	3M COMPANY	66- 93	90 1/4	-1 5/8	-1.6
O	MOORE CORP LTD	27- 37	34 1/8	-2 1/8	-5.8
N	NASHUA CORP	20- 35	27 5/8	- 1/2	-1.7
O	STANDARD REGISTER	22- 35	31	-2 1/4	-6.7
A	TAB PRODUCTS CO	13- 31	29 1/2	-1	-3.2
A	WABASH MAGNETICS	11- 18	15 1/8	- 3/4	-4.7
A	WALLACE BUS FORMS	23- 45	43 1/2	-1 3/4	-3.8

EXCHG KEY: N=NEW YORK A=AMERICAN P=PHIL O=OVER-THE-COUNTER
NASDAQ=NATIONAL ASSOCIATION OF SECURITIES DEALERS AUTOMATED QUOTATIONS
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

See SSI's NEW 900 lpm band printer at the Info 80 show, Booth 2133

Band Printers. Your Output Needs Answered... Again. By Southern Systems.

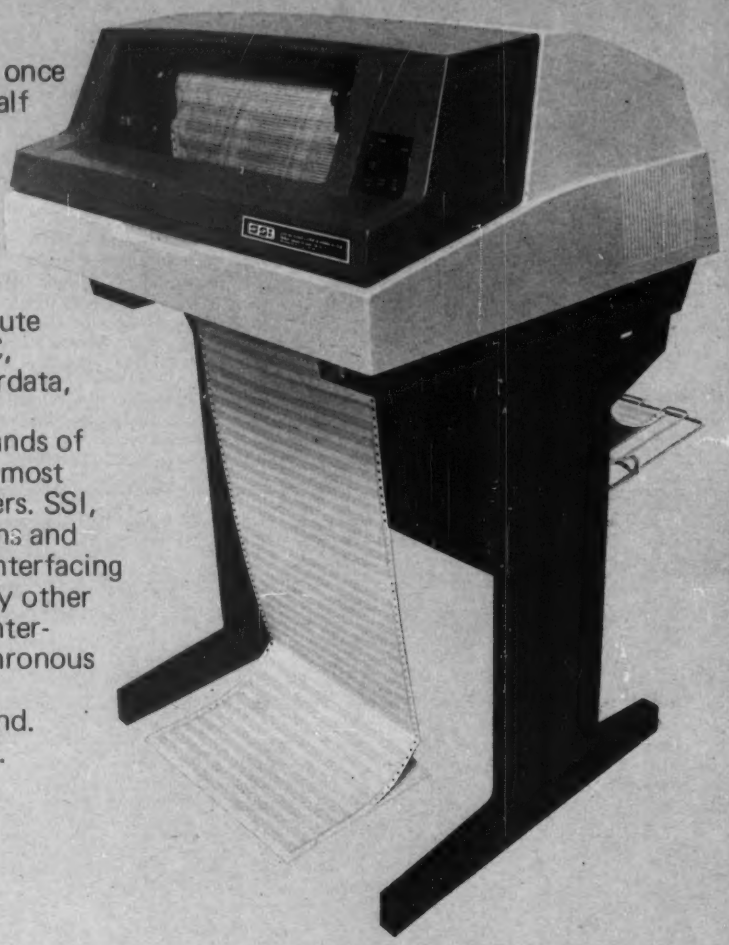
The line printer leader takes the lead once more. To bring you line printers at half the cost you once paid. Through proven band printer technology with the reliable interfacing that only Southern Systems designs and manufactures – PARALLEL or SERIAL.

An SSI 300 or 600 line-per-minute band printer is compatible with DEC, Data General, Hewlett Packard, Interdata, Burroughs, TI and others.

Put your printer needs in the hands of Southern Systems, the one with the most experience in configured band printers. SSI, the only printer company that designs and builds its own computer-to-printer interfacing for DEC and DG's full line plus many other processors, both parallel and serial interfacing, with asynchronous and synchronous protocols.

It's time for you to Join the Band. At 300, 600 or 900 lines per minute.

(800) 327-5602



SSI **SOUTHERN SYSTEMS, INC.**

2841 Cypress Creek Road, Fort Lauderdale, Florida 33309
(305) 979-1000 / (800) 327-5602 / Telex 522135

To SSI Marketing: I'm ready to Join the Band at _____ lines per minute. Send more information. My needs are:
__Immediate. __3-6 months. __For Information Only.
I'd also like to know more about your:
__M-200 (200 lpm impact matrix)
__2550 (1500 lpm charaband)
__2200 series (300, 600, 900 lpm drum)
__CT 1200 series (600, 1000, 1200 lpm ChainTrain)
__SI 22 serial interfacing

Name _____
Company _____
Address _____
City _____ State _____ Zip _____
Telephone _____
My computer type is _____